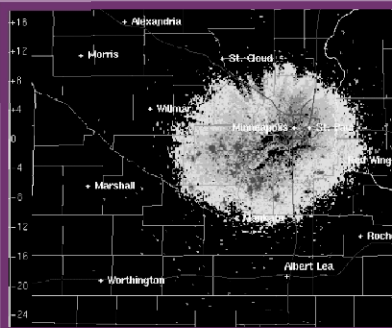
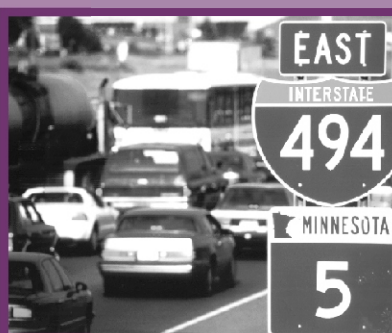
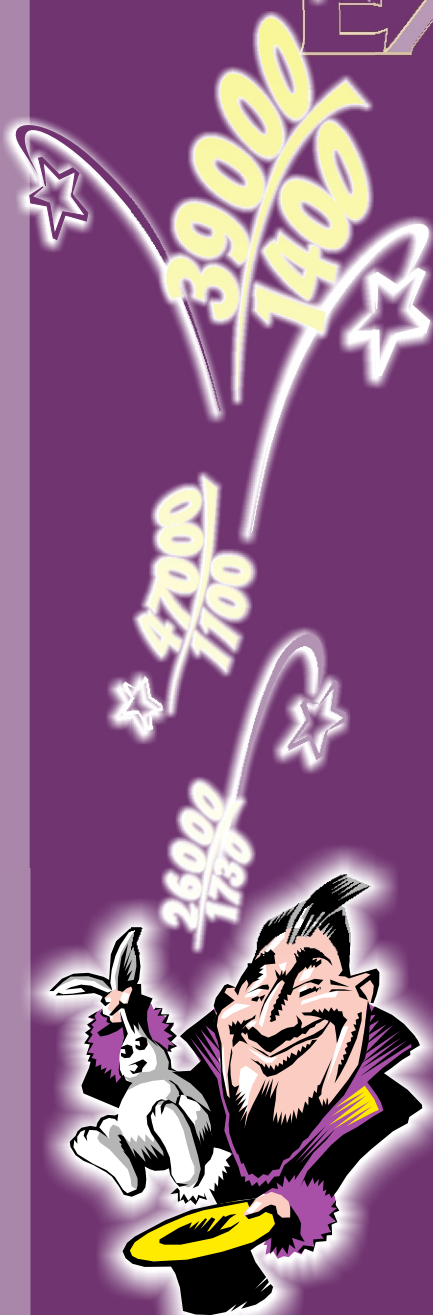


Discover the magic of

DATA

EXTRACTION



Minnesota
Department of Transportation

Metro Division
Traffic Engineering

Data Extraction Cookbook

September 2, 2003

D:/data/extraction cookbook.doc

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Acknowledgements

I want to acknowledge the contribution of the following individuals for making the Data Extraction Cookbook a reality. Tim Johnson developed and customized the DataExtract program to meet our modeling needs. This task reduced the time to extract system data from days to a few minutes. Denise Hesselroth developed Metro Incident Selection Tool (MIST) and supportive documentation. MIST is the front-end application to Mn/DOT's Incident log database. Denise took this opportunity to work with RTMC staff and make enhancements to the Incident Log. Jim Cray was instrumental in setup and configuring the data extraction workstation at the Waters Edge facility and working through the security issues. Teresa Hyde provided valuable supportive system data and information including the All Detector Report, Ramp Metering Status, and Ramp Control System that included in the Appendix. I also want to thank Deb Bishop for reviewed and edited the Data Extraction Cookbook.

I. Chapter 1: INTRODUCTION

This Data Extraction Cookbook was put together to aid external clients in pulling system data and information. The demand for system information has steadily increase over the years as the instrumented system expanded to cover the majority of the TCMA roadway network. The system data is used for many purposes including planning, design and research. Mn/DOT is looking into creatively ways of providing this information more efficiently and effectively. Some of the factors that precipitated this need include the new Federal modeling requirements, State budget shortfall, and limited staff resources.

The instrumented portion of the Freeway Management system is the primary source of this data. The system data includes volume and occupancy data from mainline and ramp, loop detectors, and ramp metering rates. The data is stored every 30 seconds, twenty-four hours a day. The data extraction cookbook, tool documentation, and resource materials are available on the Mn/DOT Metro Division web site:

<http://www.dot.state.mn.us/metro/trafficeng/modeling> and can be downloaded.

A copy of this resource document is available at the Mn/DOT's Water Edge facility and **should not** leave the work area located in Traffic Engineering.

II. Chapter 2: BACKGROUND

This chapter outlines the user requirements, contacts for user support, hardware and software available to customers, and the startup procedure to access the data.

A. User Requirements

Below explains the user requirements for customers using Mn/DOT facilities and equipment to extract data and information. Please contact Gabriella Tsurutani at (651) 634-5277, if you have a large data pull that could impact the Freeway Management System or computer network.

- ***Register at the Front Desk***

External clients are required to register at the Waters Edge front desk. The data extraction computer is located on the second floor in Traffic Engineering. The receptionist on the second floor will direct you to the workstation.

- ***Data pulls are conducted during off-peak period***

Data extraction should be conducted during the off-peak periods, between the hours of 9:00 A.M and 3:00 P.M.

- ***Bring CD or Floppy Disks***

The external customer is responsible for supplying their own CD or floppy disks to store the extracted data.

- ***Sign the Log Book***

We ask that you sign-in the logbook and record any problems, questions, and/or comments that you may have on the documentation, tools, or equipment provided. This will allow us a way to continuously improve this service.

B. User Support

Below is a list of resources available to you if you experience problems with the equipment and software/tools or if you have technical questions.

Support Area	Specific Topics	Contract
Computer	Physical computer, network, & office packages	Metro MIS Unit Jim Cray (651) 582-1202
Extraction Tools	DataExtract, DataPlot, and IRIS reports	RTMC Computer Support Tim Johnson (651) 634-5252
Technical Questions	Ramp Metering status or timing,	RTMC Operation Gabriella Tsurutani (651) 634-5277
	Control room observations	RTMC Operations Teresa Hyde (651) 634-5311
Data Extraction	Modeling data requirement	Metro Modeling Unit Linda Taylor (651) 634-2126

Table II-1.1 Support Area Contact List

C. Equipment

The workstation provided has been configured to facilitate your data extraction process. The system is set-up to allow you access only to the systems, information, data, and software packages required to perform the functions necessary to access, select, extract, and store data identified within the Data Extraction Cookbook. Desktop icons have been developed for each application software package.

1. Office Packages

The following office packages are loaded on the workstation:

- Access 97 (This is the version of software currently used by RTMC for their detector, ramp meter and incident databases).
- Office 2000 - Word
- Office 2000 - Excel
- WipZip version 8.0
- Ez CD creator version 5.0

Several data extraction programs have been developed internally over time for different purposes. Below provides a listing of the tools/programs available to you and a brief description of how they can facilitate the data extraction process.

a) DataPlot Program

DataPlot is a program for visualizing freeway traffic data in the Twin Cities Metropolitan Area. DataPlot has access to 3500+ traffic detectors on the instrumented freeway system. The “All Detector Report” provides a listing of available detectors. This document is available to you in many formats:

- A hardcopy format can be found in Appendix A: All Detector Report.
- On-line copy is accessible from the Waters Edge workstation by selecting the “All Detector Report” icon.
- Electronic copy is available on the Mn/DOT web:

[Http://www.dot.state.mn.us/metro/trafficeng/modeling](http://www.dot.state.mn.us/metro/trafficeng/modeling)

Traffic data is available from 1994 to present day. This program allows the user to graphically plot system detectors. The DataPlot program is capable of plotting either one detector with multiple dates, or multiple detectors (up to 10) with one date. Refer to Appendix B for the hardcopy of the DataPlot program. This program is very useful in determining if a detector is malfunctioning and to determine peak periods.

b) DataExtract Program

Data Extract is a graphical program for retrieving historical traffic data for the Twin Cities Metropolitan Area. It is designed to simplify the extraction process and is not intended to be a tool for data manipulation (although a limited set of manipulation tools are available). A copy of the DataExtract User manual is located in Appendix C.

c) IRIS Reports

The IRIS reports were developed over time to address specific needs by the operations, maintenance, and integration staff for accessing system data. The ramp meter analysis and continuity reports are useful for modeling.

The Ramp Meter report provides the ramp meter timing for a specific day. This information replicates the ramp metering timing within CORSIM. The Continuity report provides a means to quickly review a roadway segment and identify mainline and/or ramp detectors that are problematic. The RTMC Operations unit uses this program to evaluate the existing system. Reference Appendix D, for a copy of the IRIS User manual.

D. Startup Procedure

Below outlines the procedure for accessing the Metro data extraction workstation.

- Sign in at the Water's Edge front desk and receive a visitor badge. Take the elevator to the second floor turn right to the Metro Traffic Engineering office. The traffic receptionist will direct you to the data extract computer workstation.
- Sign the data computer logbook located at the computer workstation. The workstation positioned behind the receptionist desk.
- Turn the computer on by selecting the power switch on the central processing unit.

Once the computer is power on, the main screen is configured to facilitate the extraction of system data and information.

III. CHAPTER 3: DATA REQUIREMENTS

This chapter walks you through the process of extracting system data using the data and tools provided by Mn/DOT. The system data extraction flowchart is documented in Figure 1. This flowchart will be reiterated throughout the text to reinforce the steps in the process.

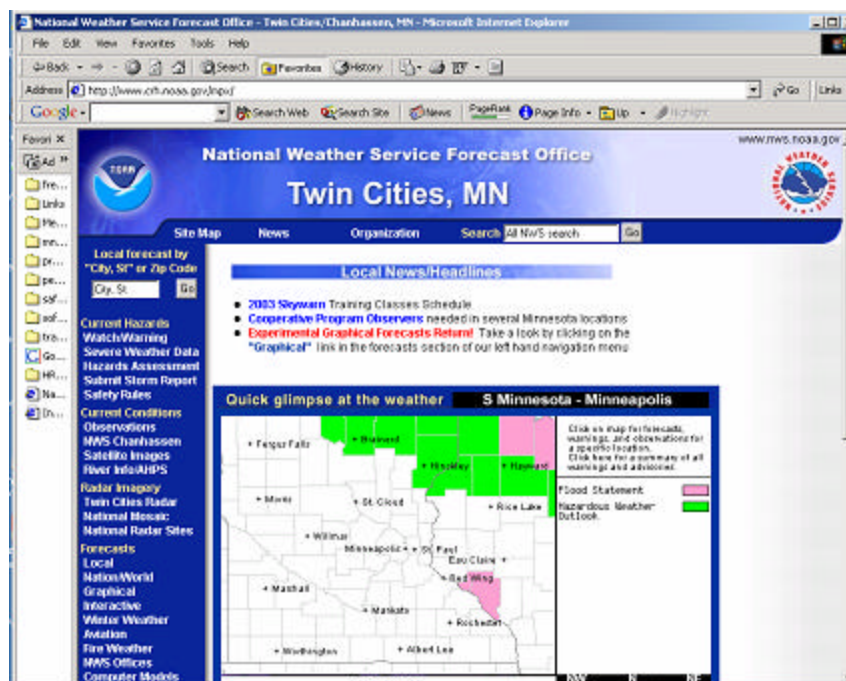
The first step in the process is to determine feasible dates that can be used to pull system data. Outlined below are the steps in the process:

- Step 1: Start by selecting and printing out a calendar for September October timeframe for the previous year.
- Step 2: Eliminate Fridays, Saturdays, Sundays and Mondays.
- Step 3: Eliminate holidays and the days proceeding or following a holiday.
- Step 4: Eliminate bad weather days.
- Step 5: Eliminate dates that the roadway is impacted by incidents.

A. Weather Impacts

The weather information can be accessed from the National Weather Service Forecast Office. This site has weather information by month and year for the Twin Cities Metropolitan Area. Select the month and year of interest. Typically, this is last year for September and October timeframe. Below outlines the steps necessary to identify days that should be eliminated due to bad weather.

Step 1: Log onto the National Weather Service web site: .



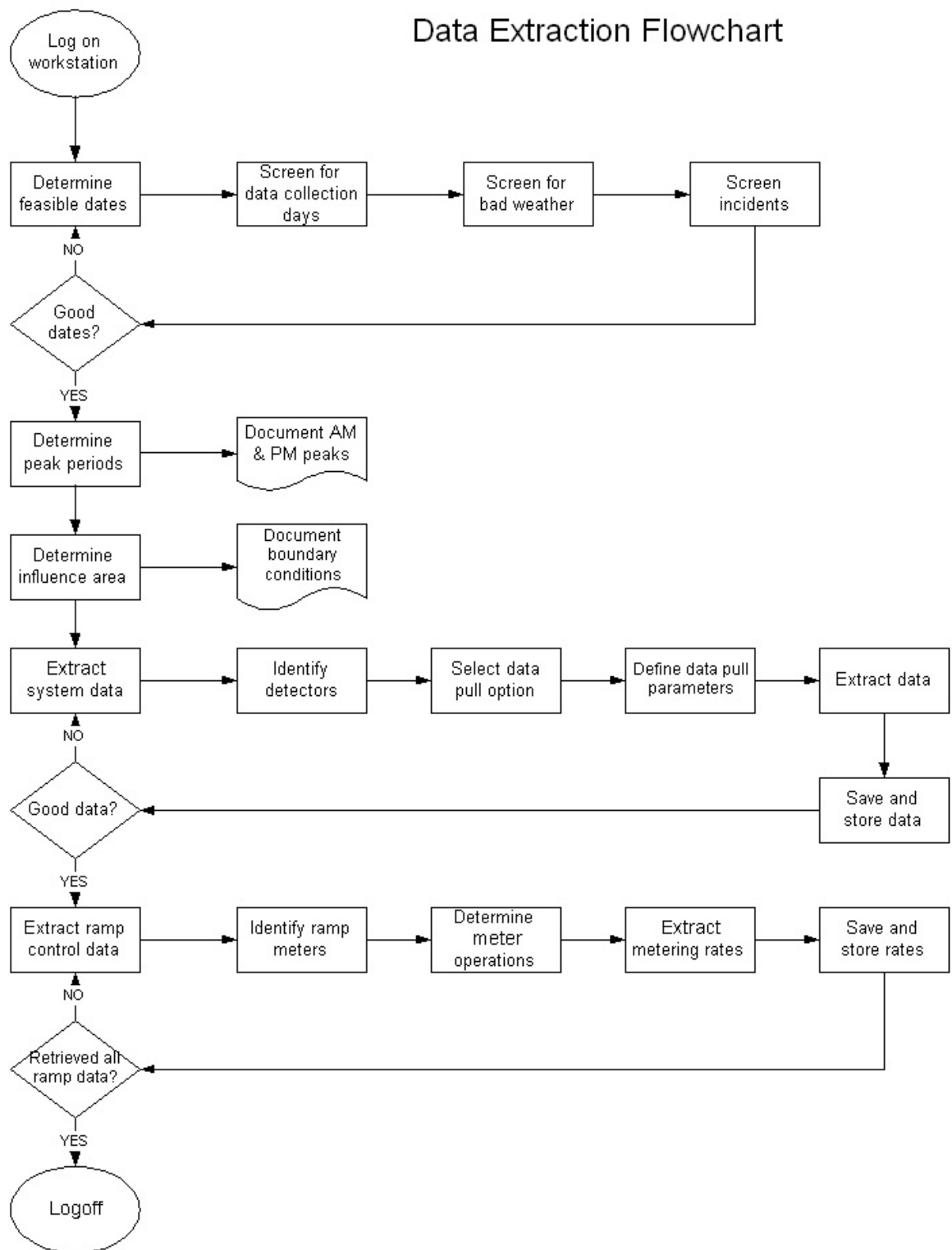


Figure III-1 Data Extraction Flowchart

Step 2: Select the appropriate file.

Typically, the dataset used is the previous year and either late September or early October timeframe.

For example, for September 2002 weather data select the file:
mpxsep2002.html.



Figure III-2 National Weather File

Step 3: Build a Calendar

The calendar should identify all possible data extract days. Start by eliminating Fridays, Saturdays, Sundays and Mondays and any days following a major holiday. When selecting dates in September and October, remember to exclude the day after Labor Day and Halloween.

Review the weather information provided. Pay particular attention to columns 7 (WTR-precipitation), 8 (SNW-snowfall amounts) and 16 (unusual events). Snow dates and dates flagged in column 16 should be eliminated. Precipitation of .20 inches or greater should be eliminated.

Figure III-3 Local Climatological Data

Step 5: Update the calendar of possible date(s) and proceed by checking for incident impacts.

B. Incidents Impacts

The IncModeling.mdb is a “front-end” database linked to a copy of the Mn/DOT Incident Log database. This front-end program streamlines the preprocessing of the Incident Log database to help identify incident impact days that should be eliminated. The end user is able to query the database by specific criteria (year, month, highway, and impact type), which is selectable from the main screen.

To access the front-end application, click on the MIST (Metro Incident Selection Tool) icon on the desktop. This will automatically bring up the front-end form and link you to the database.

This is the opening form:

Metro Incident Selection Tool

Highway: Begin Ref Pt: End Ref Pt: Year: Month:

Highway / Month | Timeframe, Date and Impacts Selection | Utilities | Reports

Select a month and a highway:

Year: Month:

Highway: Optional: points

Cross St	Accum Miles
13 (TH)	113.689
CR 18	114.526
Minnesota	115.015
River View	116.124
108th St	116.351
Pioneer Tr	117.098
Anderson Lakes Pk	118.345
Anderson Lakes	119.036
Highwood Dr	119.686
494 (I)	120.023
Valley View Rd	120.971
62 (TH)	122.189
212 (TH)	122.198
Lincoln Dr	122.784
Bren Rd	122.784
7th St	123.789
Excelsior Blvd	124.544
7 (TH)	125.289
36th St	125.653
Minnetonka Blvd	126.112

Entire Highway


Selected Crossroads

When your selections appear above, go to the "More Selections" page.

Clear selections

Figure III-4 Selection Tool Main Form, Highway/Month Tab

Step 1: Select a Year and Month

A year must be entered. The current year is entered by default. Select a month by clicking  on the drop down button and clicking on the month.

Step 2: Select a Highway

Start by selecting the Highway from the drop down menu or just type in its number in the box. The program will automatically generate a list of crossroads. You have the option to select the entire roadway or a segment of the roadway by clicking either **"Entire Highway"** or (if you have selected two crossroads) **"Selected Crossroads"**. Your selected parameters will appear in the boxes at the top of the form.

Step 3: Click the Timeframe, Date and Impacts Selection tab, which is located at the top of the form to select the timeperiods, days and impacts to include in the query.

Metro Incident Selection Tool

Highway: 169 (TH) Begin Ref Pt: 122+00.172 End Ref Pt: 127+00.813 Year: 2003 Month: 3

Highway / Month Timeframe, Date and Impacts Selection Utilities Reports

Only include incidents from:

06:00 to 09:00 and 15:00 to 18:00

Each line represents 30 minutes

00:00	12:00 AM	12:00	12:00 PM
00:30	12:30 AM	12:30	12:30 PM
01:00	1:00 AM	13:00	1:00 PM
01:30	1:30 AM	13:30	1:30 PM
02:00	2:00 AM	14:00	2:00 PM
02:30	2:30 AM	14:30	2:30 PM
03:00	3:00 AM	15:00	3:00 PM
03:30	3:30 AM	15:30	3:30 PM
04:00	4:00 AM	16:00	4:00 PM
04:30	4:30 AM	16:30	4:30 PM
05:00	5:00 AM	17:00	5:00 PM
05:30	5:30 AM	17:30	5:30 PM
06:00	6:00 AM	18:00	6:00 PM
06:30	6:30 AM	18:30	6:30 PM
07:00	7:00 AM	19:00	7:00 PM
07:30	7:30 AM	19:30	7:30 PM
08:00	8:00 AM	20:00	8:00 PM
08:30	8:30 AM	20:30	8:30 PM
09:00	9:00 AM	21:00	9:00 PM
09:30	9:30 AM	21:30	9:30 PM
10:00	10:00 AM	22:00	10:00 PM
10:30	10:30 AM	22:30	10:30 PM
11:00	11:00 AM	23:00	11:00 PM
11:30	11:30 AM	23:30	11:30 PM

INCLUDE:

☐ M, F, Sat, Sun
☒ T, W, Th

☐ M, T, W, Th, F
☐ Sat, Sun

☐ No Impact
☒ Minimal Impact
☒ 1/2 mile Impact

Higher impact incidents are always included. ("unknown" included for older data.)

Save Data **Count Incidents**

Hint:
 You can change the values in the top five boxes "by hand" instead of going back to the first tab.

This way you can quickly look at each month for the same set of parameters.

Figure III-5 Timeframe, Data and Impact

This is the second tab:

Incident Selection Form

Highway: 169 (TH) Begin Ref Pt: 122+00.172 End Ref Pt: 127+00.813 Year: 2002 Month: 9

Highway/Month Select More Selections and SAVE Data Tables Reports

Only include incidents from:

06:00 to 09:00 and 15:00 to 18:00

Each line represents 30 minutes

00:00	12:00 AM	12:00	12:00 PM
00:30	12:30 AM	12:30	12:30 PM
01:00	1:00 AM	13:00	1:00 PM
01:30	1:30 AM	13:30	1:30 PM
02:00	2:00 AM	14:00	2:00 PM
02:30	2:30 AM	14:30	2:30 PM
03:00	3:00 AM	15:00	3:00 PM
03:30	3:30 AM	15:30	3:30 PM
04:00	4:00 AM	16:00	4:00 PM
04:30	4:30 AM	16:30	4:30 PM
05:00	5:00 AM	17:00	5:00 PM
05:30	5:30 AM	17:30	5:30 PM
06:00	6:00 AM	18:00	6:00 PM
06:30	6:30 AM	18:30	6:30 PM
07:00	7:00 AM	19:00	7:00 PM
07:30	7:30 AM	19:30	7:30 PM
08:00	8:00 AM	20:00	8:00 PM
08:30	8:30 AM	20:30	8:30 PM
09:00	9:00 AM	21:00	9:00 PM
09:30	9:30 AM	21:30	9:30 PM
10:00	10:00 AM	22:00	10:00 PM
10:30	10:30 AM	22:30	10:30 PM
11:00	11:00 AM	23:00	11:00 PM
11:30	11:30 AM	23:30	11:30 PM

INCLUDE:

☐ M, F, Sat, Sun
☒ T, W, Th

☐ M, T, W, Th, F
☐ Sat, Sun

☐ No Impact
☒ Minimal Impact
☒ 1/2 mile Impact

Higher impact incidents are always included. ("unknown" included for older data.)

Save Data **Count Incidents**

Figure III-6 More Selection and Save Tab

From here you can further narrow down the selection of incidents:

- Choose a timeframe for the AM rush hour and the PM rush hour
 - o If you want to include all times just click on the pre-selected times to deselect them.
 - o If you select more than two times the program will only use the first two selected times.
 - o If you select only one time it uses that as the From time.
- Choose at least one set of days from the center two boxes.
- Choose to include the smaller impact incidents if you wish.
- Click **Count Incidents**.

Incidents will be counted by date.

To eliminate holidays, days after holidays, days of bad weather, etc. :

- Click on the day(s) you want to remove.
 - Click **“Add selected dates to the ‘excluded’ list”** button
- The selected dates are added to the EXCLUDED dates list

Click date(s) to be EXCLUDED, then click the Count button again.

INCLUDE:

☐ M, F, Sat, Sun
☒ T, W, Th

☐ M, T, W, Th, F
☐ Sat, Sun

☐ No Impact
☒ Minimal Impact
☒ 1/2 mile Impact

Higher impact incidents are always included. ("unknown" included for older data.)

EXCLUDED dates:

Add selected dates to the "excluded" list

Day of Week	Date	IncCount
Tuesday	9/3/2002	1
Thursday	9/5/2002	2
Tuesday	9/10/2002	2
Wednesday	9/11/2002	1
Tuesday	9/17/2002	3
Tuesday	9/24/2002	2
Wednesday	9/25/2002	1
Thursday	9/26/2002	4

Save Data **Count Incidents** Click date(s) to be EXCLUDED, then click the Count button again.

INCLUDE:

☐ M, F, Sat, Sun
☒ T, W, Th

☐ M, T, W, Th, F
☐ Sat, Sun

☐ No Impact
☒ Minimal Impact
☒ 1/2 mile Impact

Higher impact incidents are always included. ("unknown" included for older data.)

EXCLUDED dates:

9/3/2002
9/26/2002

Add selected dates to the "excluded" list Clear all dates from the "excluded" list

Day of Week	Date	IncCount
Tuesday	9/3/2002	1
Thursday	9/5/2002	2
Tuesday	9/10/2002	2
Wednesday	9/11/2002	1
Tuesday	9/17/2002	3
Tuesday	9/24/2002	2
Wednesday	9/25/2002	1
Thursday	9/26/2002	4

Hint:

The text of the buttons turns black or gray to remind you that new selections may have changed the results that are showing.

However, the buttons are still active no matter what color their text is.

You must click the **Count Incidents** button again to exclude them from the results.

Click the **SAVE DATA** button to save the details of the selected incidents to an Excel spreadsheet. You do not have to click **Count Incidents** before clicking **SAVE DATA**.

- The file is given the name of the highway, year and month like this:

o US169_2002_9.xls or
I394_2002_10.xls

Count Incidents Click date(s) to be EXCLUDED, then click the Count button again.

Add selected dates to the "excluded" list Clear all dates from the "excluded" list

Day of Week	Date	IncCount
Thursday	9/5/2002	2
Tuesday	9/10/2002	2
Wednesday	9/11/2002	1
Tuesday	9/17/2002	3
Tuesday	9/24/2002	2
Wednesday	9/25/2002	1

- The file is saved in the subdirectory noted on the **Data Tables** tab (see next page).

Incident Selection Form

Highway: 169 (TH) Begin Ref Pt: 122+00.172 End Ref Pt: 127+00.813 Year: 2002 Month: 9

Highway/Month Select More Selections and SAVE Data Tables Reports

Save output to this location: c:\downloads\

RoadInt:	Road iLog:	Road GIS:
5 5 (TH)		MN5
10 10 (TH)		US10
12 12 (TH)		US12
35 35 (I)		I35
35 35E (I)		I35E
35 35W (I)		I35W
36 36 (TH)		MN36
52 52 (TH)		US52
55 55 (TH)		MN55
61 61 (TH)		US61
62 62 (TH)		MN62
65 65 (TH)		MN65
77 77 (TH)		MN77
94 94 (I)		I94
100 100 (TH)		MN100
110 110 (TH)		MN110
169 169 (TH)		US169
212 212 (TH)		US212
280 280 (TH)		MN280
394 394 (I)		I394
494 494 (I)		I494
694 694 (I)		I694

These are the highways you can select from.

New highways may be added but they must exist on MilePointTBL in order to be found.

MilePointTBL is a linked table from RTMC.

Figure III-7 Data Table Tab

The subdirectory where the output files will be saved is shown.

You can change this to save to another location. However, if using this database on the network then all users should have access to this subdirectory. Saving to the C: drive lets all users save their own work without being overwritten.

The look-up table for the highway selection list is shown. If incidents start being logged for new highways you can add them to this list. Those highways will only be found if they exist on the MilePointTBL table which is linked from the database copied from RTMC. Metro MIS can help to make sure all underlying tables are up to date.

Incident Selection Form

Highway: 169 (TH) Begin Ref Pt: 122+00.172 End Ref Pt: 127+00.813 Year: 2002 Month: 9

Highway/Month Select More Selections and SAVE Data Tables **Reports**

List of Reports	
rptDetailInfo	DETAIL: Basic information on each incident
rptSummaryInfo	SUMMARY: Summary of incidents selected

View Report
(Can print to default printer from here.)

Print Report
(Can choose a printer from here.)

Figure III-8 Report Tab

Select a report. You can view and/or print the report.

Reports are based on the selection criteria defined in the five boxes at the top and the selections on the “**More Selections and SAVE**” tab. You do not need to click the **Count Incidents** or **SAVE DATA** buttons to run a report.

C. Determine Peak Periods

The peak period varies considerable across the Twin Cities Metropolitan Area roadway system. Mn/DOT typically uses 6:00 to 9:00 A.M for the AM peak and 3:00 to 6:00 P.M. for the PM peak. This peak period changes significantly as you move away from the central business district toward the outer beltline. The DataPlot program is used to review the mainline detector stations and to determine the peak periods.

Step 1: Select the DataPlot icon from the desktop. This will bring up the DataPlot main screen.

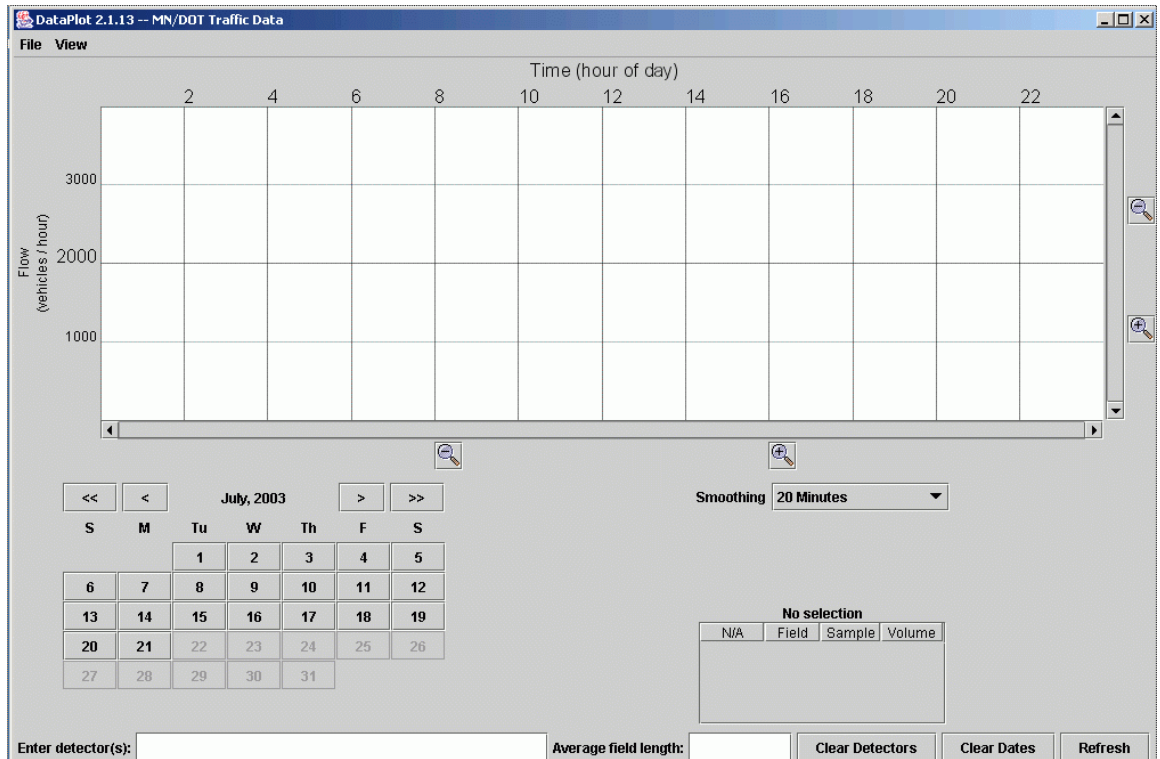


Figure III-9 DataPlot Main Screen

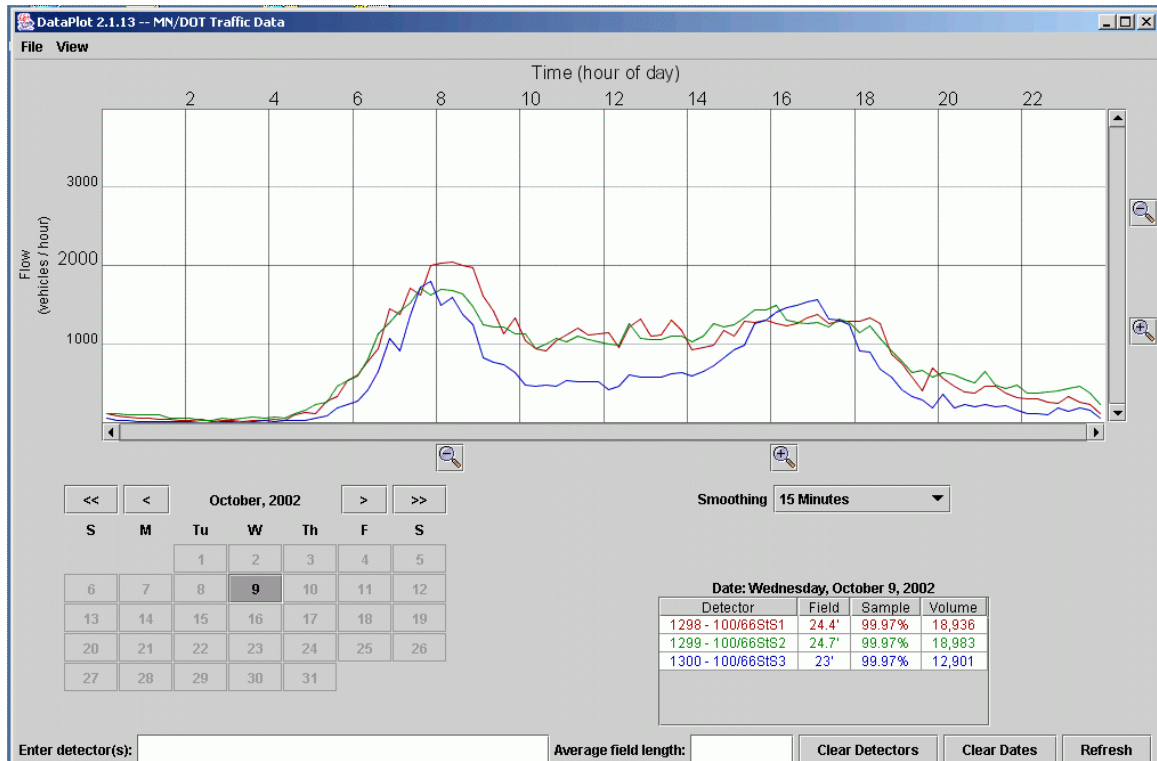
Step 2: Select the date from the calendar by using the arrow tabs to select the year and month. Click on the date to select the day.

Step 3: Select 15 minutes under the smoothing tab

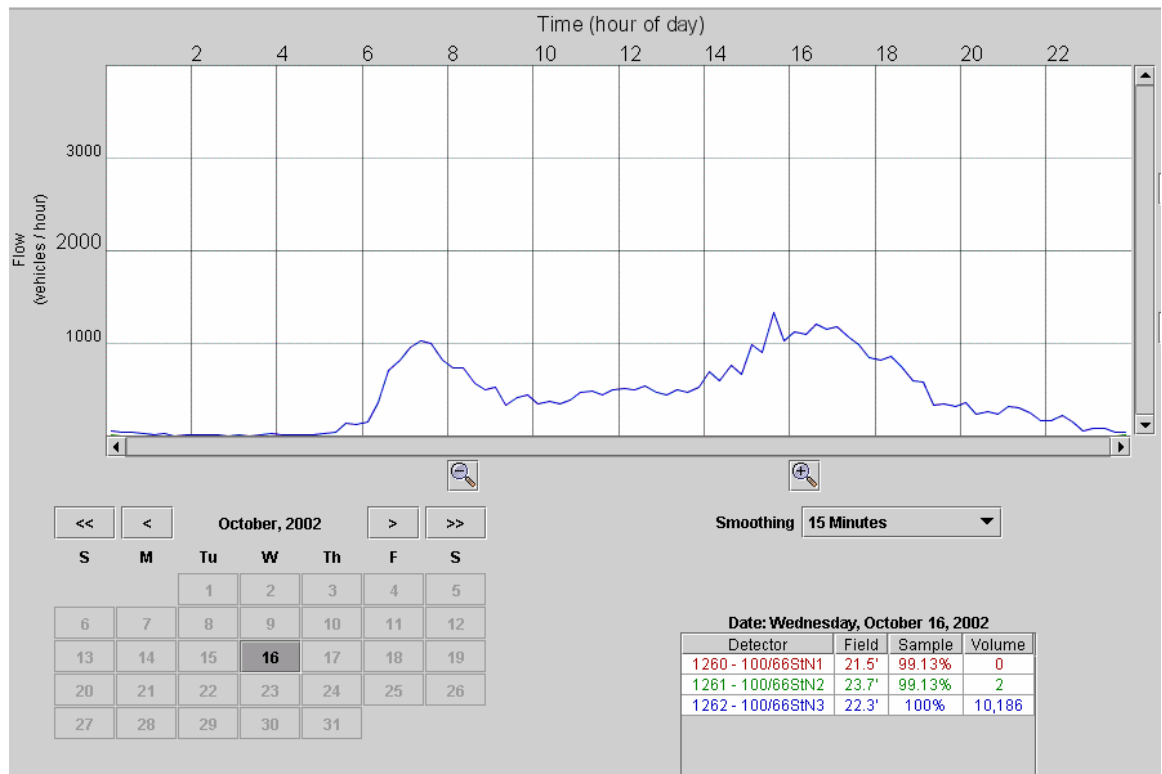
Step 4: Enter the mainline detectors by entering the detector identification.

Example: On TH 100 WB, the mainline station is 419. Station 419 is made up of three detectors: 1298, 1299 and 1300.

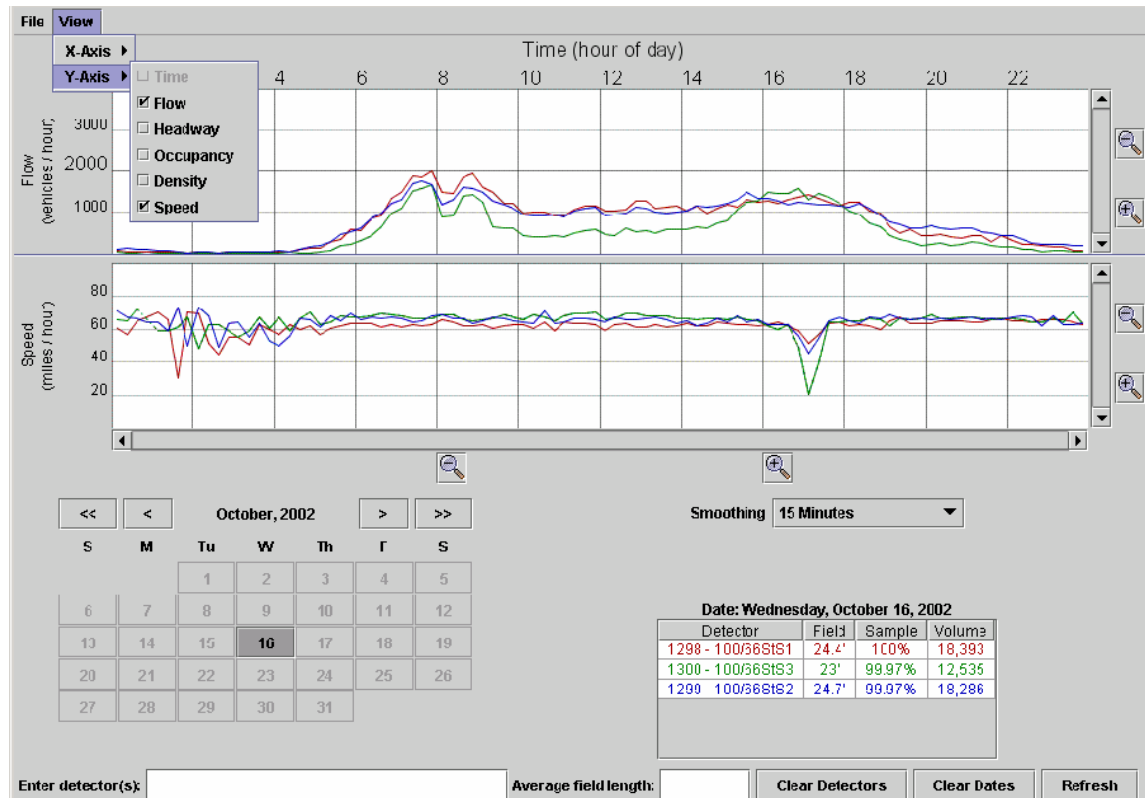
Make sure that all the detectors entered are actively recording data.



Example: On TH 100 EB, the mainline station 377 (detectors 1260, 1261 and 1262). Detectors 1260 and 1261 are bad.



Step 5: Select the view tab in the left hand corner of the screen. Highlight the Y-axis and select speed parameter. This will display the speed profile for the same date and year selected.



Step 6: Clear detectors and enter another series of mainline detectors. Repeat step 4 for several mainline station detectors. Record the AM and PM peak periods.

Step 7: Review the results and determine AM and PM peak periods for modeling.

D. Identify Modeling Project Limits

The modeling project limits are defined and mutually agreed upon at the initial modeling meeting. Section 2.1.2, in the Advanced CORSIM manual, outlines the criteria used to identify the modeling limits. **Do not assume that the construction limits are the modeling limits.** Microscopic modeling packages (CORSIM, AIMSUN, and VISSIM) all require you to start the modeling in an uncongested state for the model to work. This may require you to expand the model several miles outside of the construction limits or to modify the modeling time increments.

The procedure for identifying the modeling projects limits is similar to determining the peak periods. The DataPlot program is used to evaluate the mainline station detectors. You should be looking at the system data to determine freeflow conditions and/or uncongested traffic flow.

IV. CHAPTER 4: EXTRACT SYSTEM DATA

This section explains the process used to identify and make a list of the detectors that are needed to gather data for modeling projects.

A. Identifying Detector Numbers

Once the start and end points of a modeling project has been determined, make a list of the detector numbers using the “All Detector Report.” Break up the data by major freeway and direction. Detectors should be recorded in the sequential order of the direction of traffic flow. This same sequencing will be used in the output format. Splitting up the files in this fashion helps keep the file smaller and more manageable.

In addition, queue detectors are typically not extracted; however, this information may be useful if there is a missing or bad detector. HOV ramp volumes are usually very low and not considered unless the project specifically calls for this information.

B. Decide on the Data Pull Option

This step provides two examples of ways that data can be extracted. Each process has advantages and disadvantages. You need to decide which option works best for your project. This may change with the project size, volume of data extracted, and post processing tools available to manipulate the data.

1. Direct Data Pull

Directly enter all of the necessary mainline and ramp detectors into the Data Extract program. For example, to model I-394 from I-494 to TH 100:

- Open the “All Detector Report” to the I-394 page.
- Starting at I-494 make a list of all the detector numbers on I-394 in the eastbound direction. For example: 1645, 1646, 1647...Be sure to keep the list of detector numbers organized so that they are sorted in the direction that traffic flows.
- Save this list of detectors as an Excel file and name it “394EB Detectors.”
- Open the All Detector Report to the I-394 page.
- Starting at TH 100 make a list of all the detector numbers on 394 in the westbound direction. Be sure to keep the list of detector numbers organized so that they are sorted in the direction that traffic flows.
- Save this list of detectors as an Excel file and name it “394WB Detectors.”

Advantages:

- Faster for smaller modeling projects involving less than about 100 detectors per extraction.
- An easy, straight- forward approach to pulling data. You don’t need to build Excel tables.

Disadvantages:

- Detectors may be missing because of human errors (oversight, typographical errors, etc.)

2. Indirect Data Pull using Importing Function

This option allows the user to import a list of detectors directly into the Data Extract program. The user will create an input file in any text editor. Common editors include notepad, textpad, and Microsoft Word. The document format requirements are:

- 1) one entry per line,
- 2) line start with either a “d” or “s” and a space, then
- 3) the detector or station number

Below outlines the procedure using Excel program and building the list of detectors and import it into the Data Extract Program. This is just one way to facilitate the data extraction procedure for a large, complex modeling projects.

For example, to model I-394 from I-494 to TH 100:

Step 1: Open a blank Microsoft Excel spreadsheet.

Step 2: Open the “All Detector Report” to the I-394 page. Starting at I-494 make a list of the entire detector numbers on I-394 in the eastbound direction by typing them into the left most column in Excel. For example: 1645, 1646, 1647...Be sure to keep the list of detector numbers organized so that they are sorted in the direction that traffic flows.

Step 3: Save this list of detectors as an Excel file and name it “394EB Detectors.”

Step 4: Insert a column to the left of the column containing the detector numbers. Type a lower case “d” in each cell of the column next to the detector numbers.

Step 5: Save this new list as a “Formatted Text (Space delimited)(*.prn)” file with the same name (394EB Detectors).

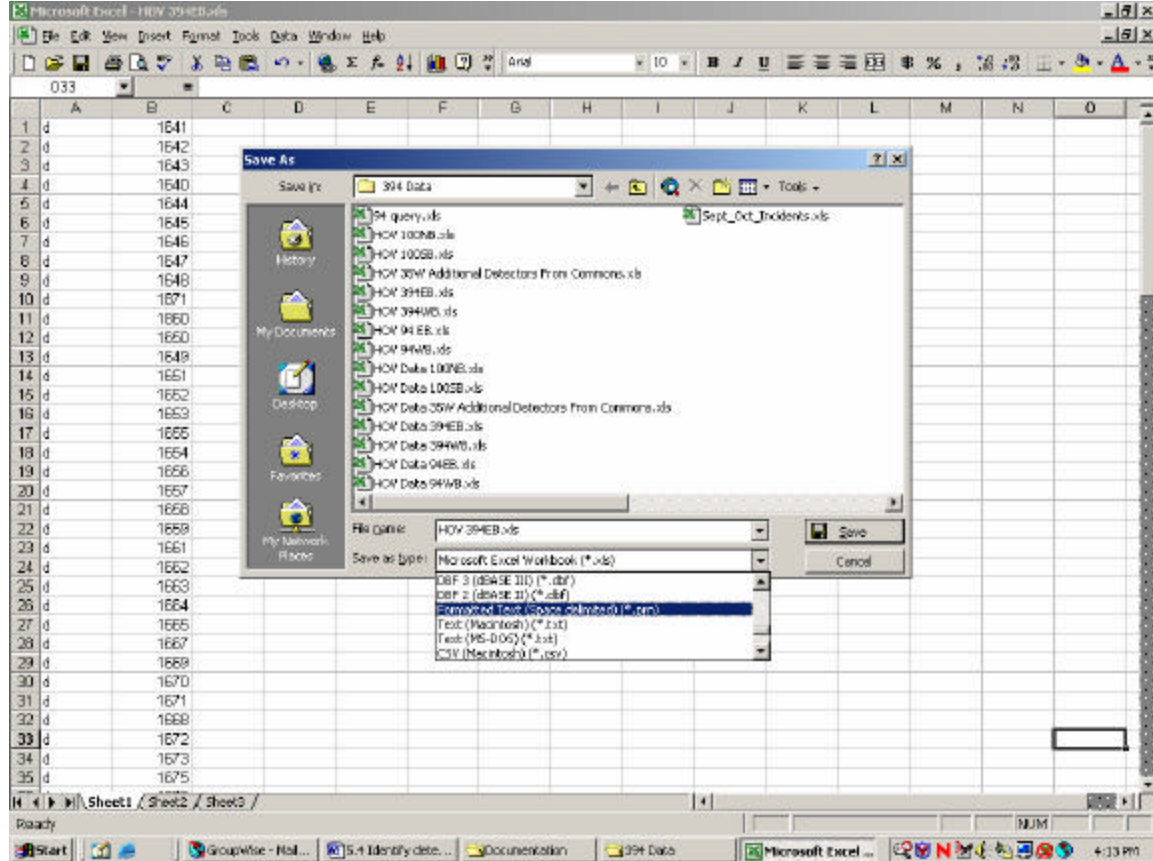


Figure IV-1 Save File Formatted Text

Step 6: Open Data Extract program by clicking on the desktop icon. Now the list of detectors can be directly imported into Data Extract program.

Step 7: In the upper left section of the Data Extract window, select the detector button.

Step 8: Click the “Import” button.

Step 9: Select the file name “394EB Detectors.prn” and click OK.

This detector selection process is now complete. The detector numbers have been selected in Data Extract without having to manually enter each one.

Advantages:

- The end user can easily check and verify that all impacted detectors have been identified.
- These Excel files can be built in advance.
- The files can be easily edited and updated if there are changes to the project limits or missing detectors or detector incorrectly entered.

Disadvantages:

- The end user needs to be familiar with Excel and data format structure.

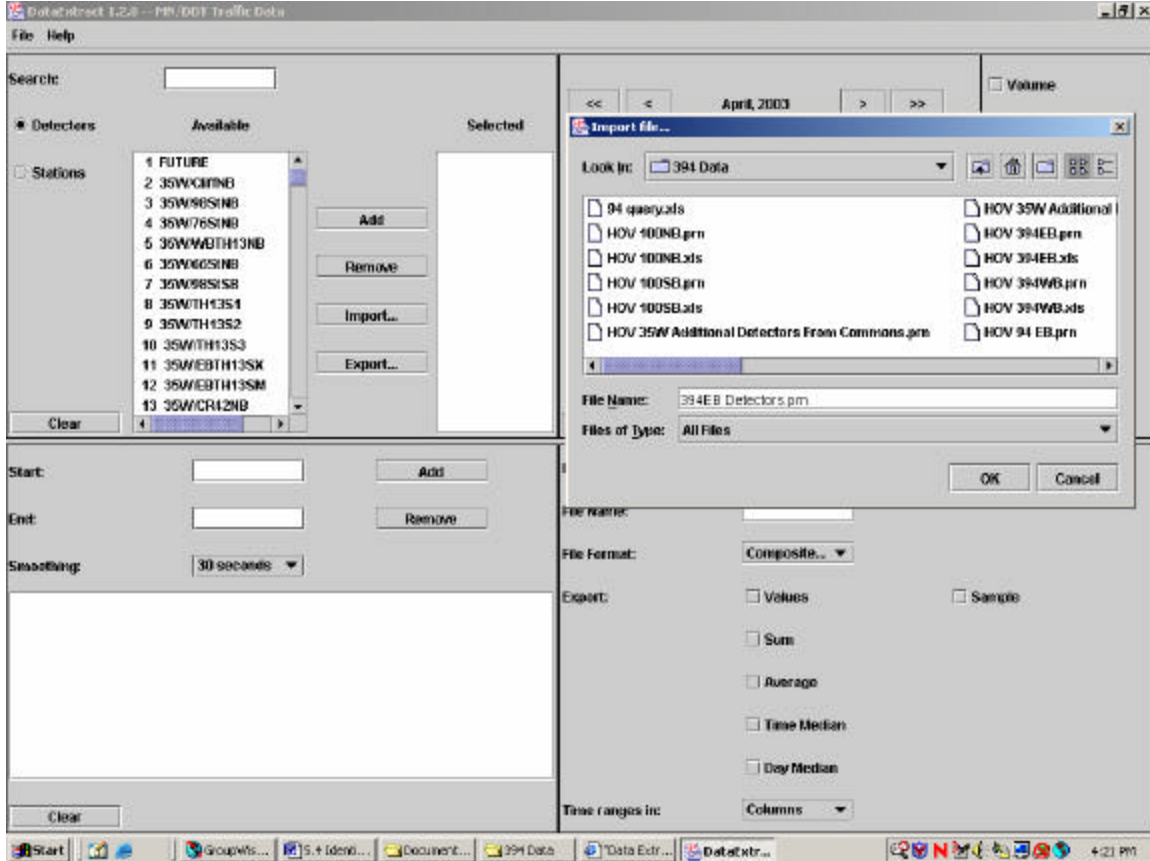
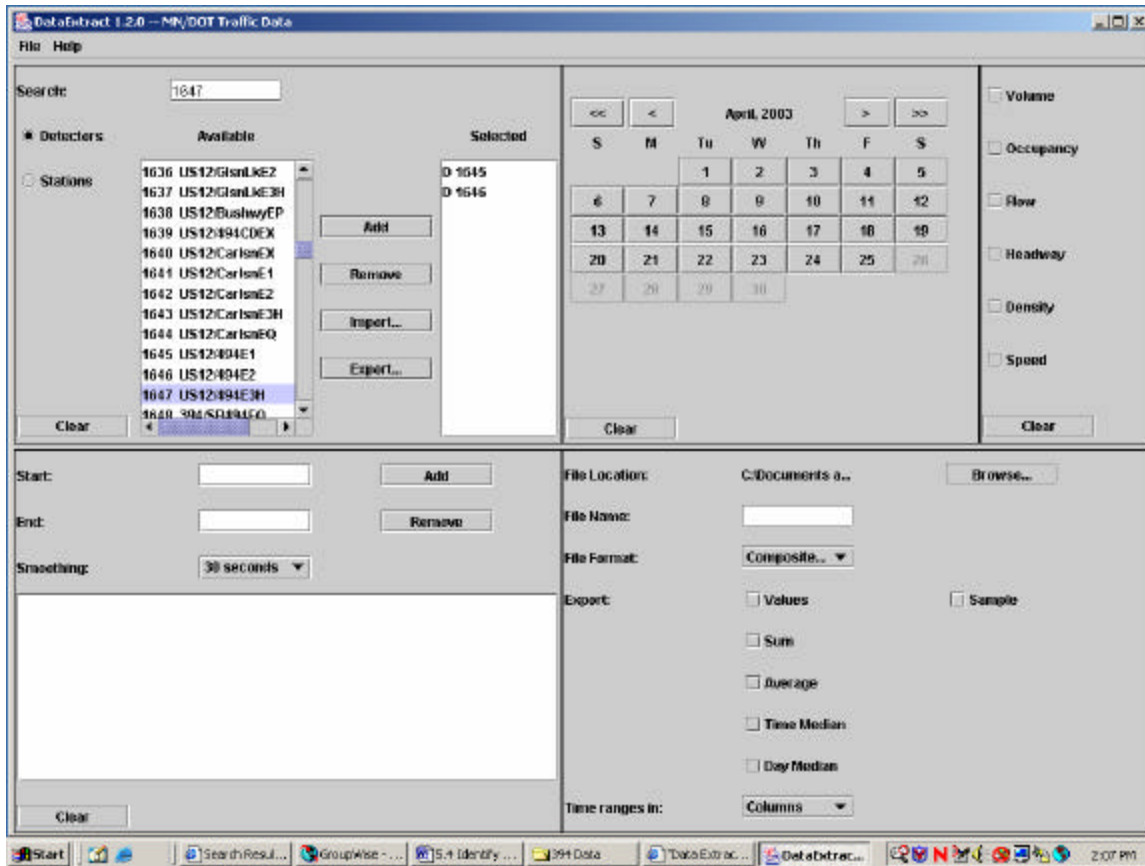


Figure IV-2 DataExtract Main Menu

C. Selecting the Mainline and Ramp detector numbers

The data extract option selected will determine how the detector information is entered into the Data Extraction program. Below outlines the direct option for pulling detector information:

- Print a copy of the Excel file “394EB Detectors”
- Open Data Extract
 - In the top left section of the Data Extract box, click the “Detector” button.
 - Place the cursor in the white box that is about two inches to the right of the word “Search:”
- Type the first detector number and press enter. The cursor will remain in that white box. Enter the remaining detector numbers in this fashion. Continue to enter all affected detectors. If the detector number is entered incorrectly, select the detector and click on the “Remove” button. Below is an illustration of how to enter the detector numbers.



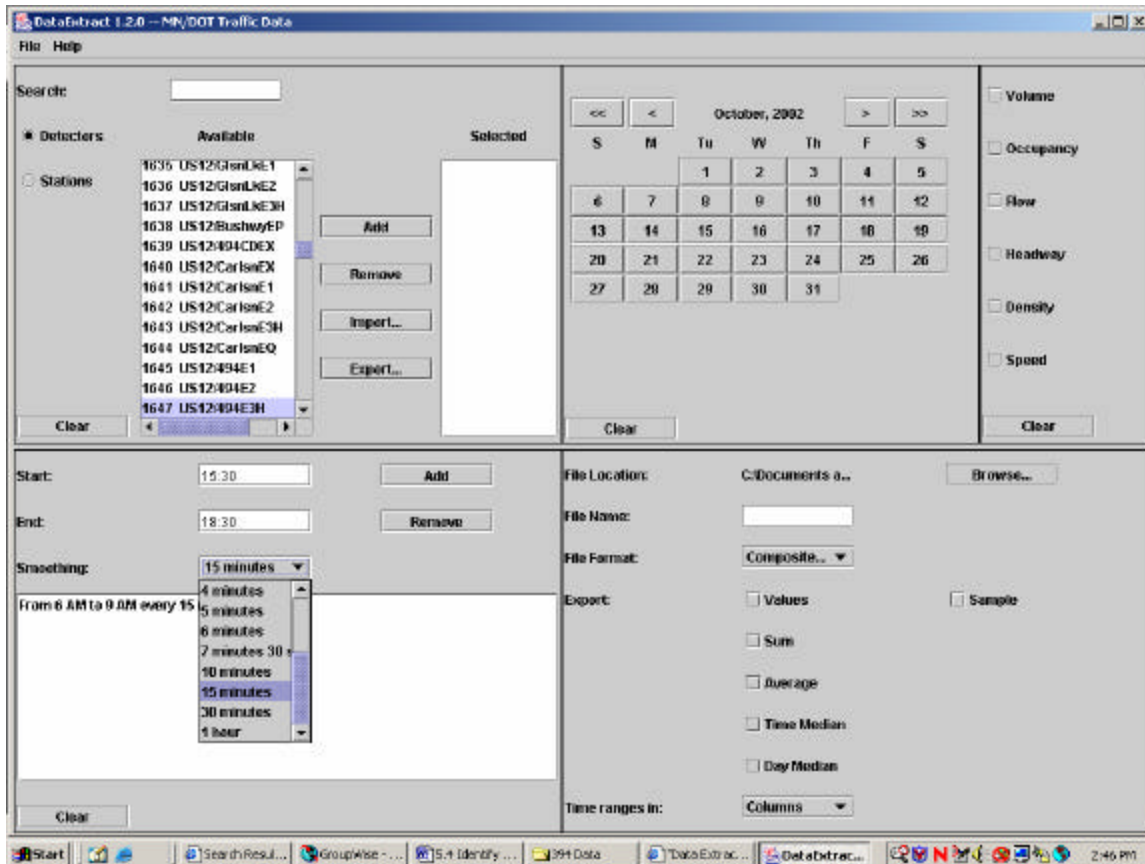
D. Define Data Pull Parameters

1. Selecting the Time Frame and Interval Length

Locate the lower left section of the Data Extract window. This is where the time frame and interval length are entered. For example, if a project calls for volume counts from 6:00-9:00AM and 3:30-6:30PM at count intervals of 15 minutes, follow this procedure:

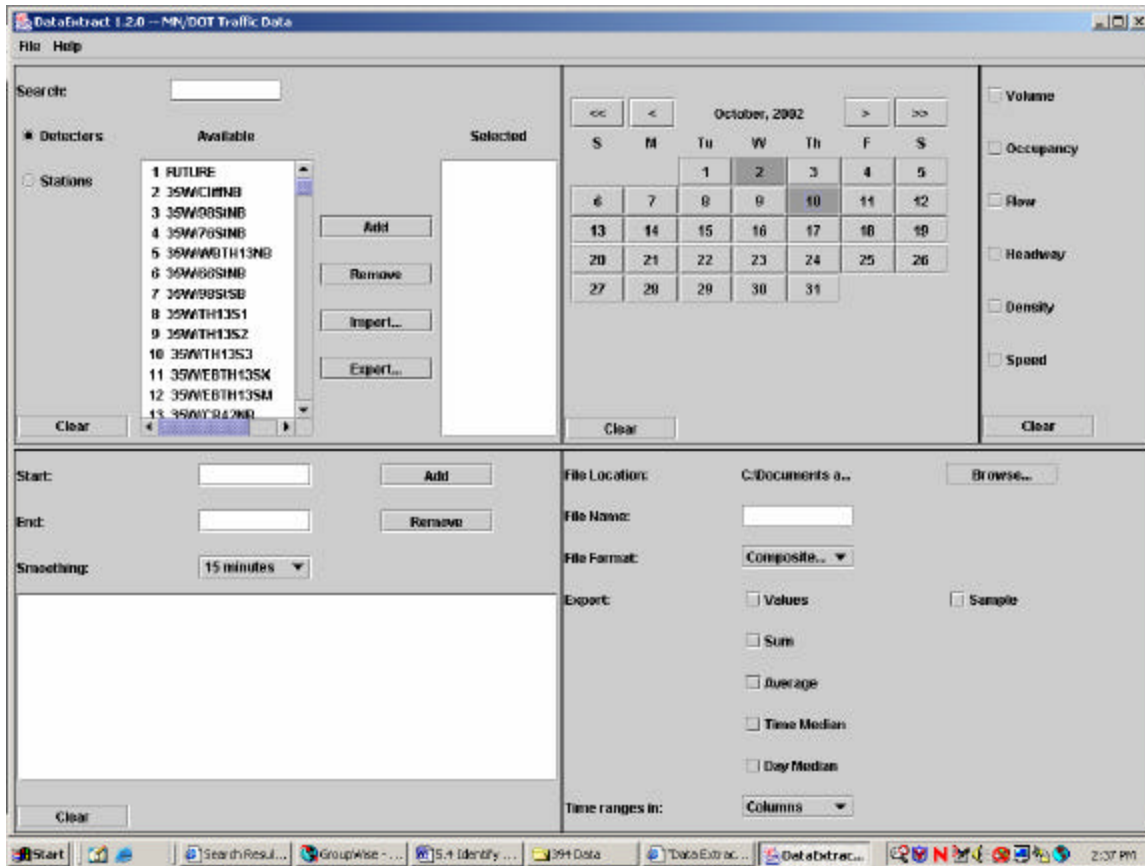
- Move the cursor to the white “Start:” box and enter 6:00
- Next, move the cursor to the white “End:” box and enter 9:00
- Click on the drop-down box next to “Smoothing:” and select 15minutes
- Click “Add”
- Move the cursor to the white “Start:” box and enter 15:30 (**Military Time**)
- Next, move the cursor to the white “End:” box and enter 18:30 (**Military Time**)
- Click “Add”
- Verify the correct time period has been selected.

This procedure is illustrated below:



2. Selecting the Date

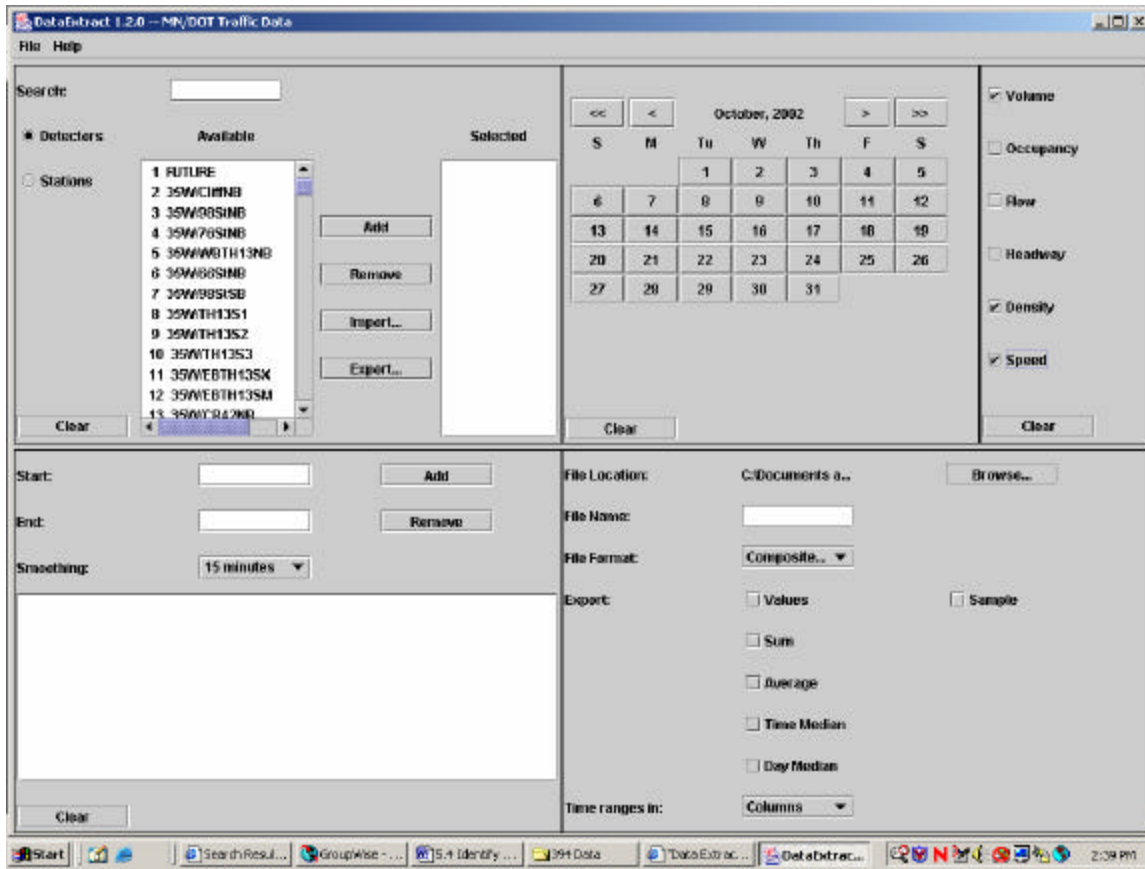
Locate the upper right section of the Data Extract window that contains the calendar. Click on the day(s) that data is to be pulled from. For example, to extract data from October 2nd and 10th 2002 simply find the October 2002 calendar and click the days. For modeling, the date selected should represent a typical day, which is not impacted by incidents or weather.



NOTE: Be sure to clear the dates selected on the calendar if you are pulling data for a different project. This is to ensure that no dates are selected that are not supposed to be selected. This can be done by simply clicking “Clear” button located below the calendar in the upper middle section of the Data Extract window.

3. Selecting the Type of Data to be gathered

Locate the upper right section of the Data Extract window. Click on the box next to the type(s) of data that needs to be extracted. Typically for modeling examples, we recommend selecting volume, density, and speed data. These data types can be selected by clicking on the boxes next to the corresponding word.



4. Define the File Name and Storage Location

To enter the file name, move the cursor to the white box next to “File Name:” in the lower right section of the Data Extract window and type “filename.”

For example, for the 394 eastbound data extraction example mentioned in section 1 above, enter “394 EB Data” in the white box.

Define the file storage location by simply click “Browse...” and select the drive and direction location where “394EB Data” is to be saved.

5. Select the File Format Structure

There are many different file format structures available within the Data Extraction program. Two file formats (Composite and Data) have been formatted to facilitate the extracting data for modeling projects. The same data and information is available through both options. The data is just presented and formatted differently depending on the option selected.

The major difference between the two options is that the composite file option places all the data in one file and the user defines the file name, while the data file option creates a file for each data type selected with a default name.

The “Composite File” format allows the end user to enter a file name and writes all the data to this file (filename.csv). Below is the Excel file created for this option. Notice that the detector information (volume, density and speed) is provided in sequential order for each timeperiod.

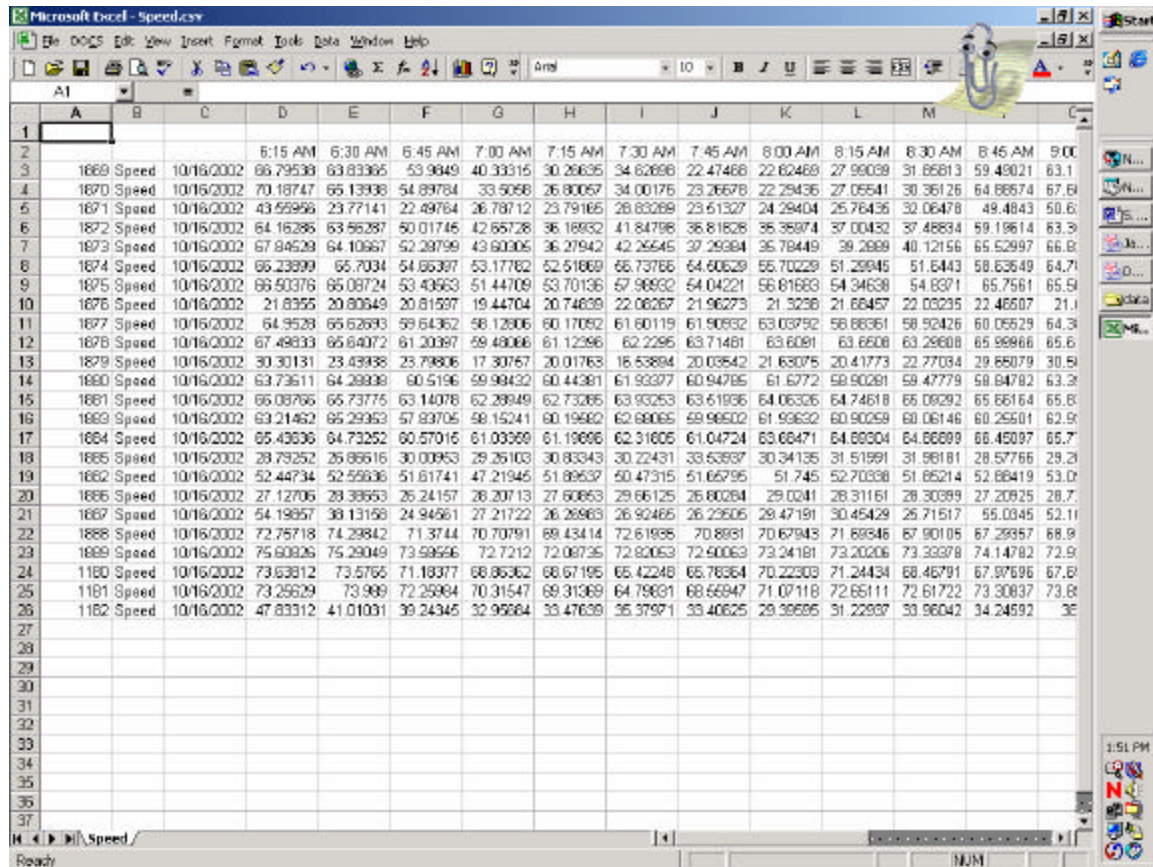
	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1														
2				6:15 AM	6:30 AM	6:45 AM	7:00 AM	7:15 AM	7:30 AM	7:45 AM	8:00 AM	8:15 AM	8:30 AM	8:45 AM
3	1669	Volume	10/16/2002	220	264	328	346	332	330	318	311	351	300	273
4	1669	Density	10/16/2002	13.5448	16.26557	25.1752	36.26355	51.09145	48.17529	71.0004	67.21623	58.85311	47.08429	19.02378
5	1669	Speed	10/16/2002	66.79638	63.63365	53.9649	40.33315	30.26635	34.62898	22.47468	22.82469	27.99039	31.85813	58.48021
6	1670	Volume	10/16/2002	485	572	573	476	462	485	423	410	464	407	478
7	1670	Density	10/16/2002	27.79736	35.5559	44.10864	62.64896	72.49417	62.76884	77.69774	83.0137	70.90951	65.35959	29.99543
8	1670	Speed	10/16/2002	70.18747	65.13938	54.86984	33.5068	26.80057	34.00176	23.26678	22.29436	27.85541	30.36126	64.89574
9	1671	Volume	10/16/2002	139	155	249	230	219	247	267	241	196	200	193
10	1671	Density	10/16/2002	14.27556	31.04444	48.44445	57.58222	43.55555	38.77777	56.94222	51.89333	42.43111	30.31112	15.87556
11	1671	Speed	10/16/2002	43.55956	23.77141	22.45764	26.78712	23.79165	28.83289	23.51327	24.29404	25.76435	32.05478	49.4843
12	1672	Volume	10/16/2002	335	412	487	461	443	458	450	418	441	408	416
13	1672	Density	10/16/2002	21.09688	26.1787	41.1391	44.34605	54.16406	45.01801	51.85843	50.7519	48.85388	46.96553	28.34348
14	1672	Speed	10/16/2002	64.16286	63.96287	50.01745	42.65728	36.16932	41.84798	36.81828	35.35974	37.00432	37.48934	59.19614
15	1673	Volume	10/16/2002	495	610	626	589	580	597	549	548	567	553	534
16	1673	Density	10/16/2002	29.4119	38.37777	49.91468	56.19603	68.64961	58.06865	62.14127	65.09603	59.28215	61.03692	32.26627
17	1673	Speed	10/16/2002	67.84528	64.10867	52.28799	43.60305	36.27942	42.25545	37.29384	35.78449	39.2889	40.12158	65.52997
18	1674	Volume	10/16/2002	322	409	475	458	437	439	440	395	415	405	384
19	1674	Density	10/16/2002	19.72095	25.19151	35.6834	35.17071	34.06306	31.32917	33.10895	28.9938	32.83429	32.003	26.45127
20	1674	Speed	10/16/2002	66.23899	65.7034	54.66397	53.17782	52.51869	56.73766	54.50629	55.70229	51.29945	51.6443	58.63549
21	1675	Volume	10/16/2002	520	584	638	580	609	603	575	570	587	595	558
22	1675	Density	10/16/2002	31.57128	36.8816	48.38189	46.6046	45.88862	41.81885	44.2318	40.4977	43.77863	42.92107	34.49196
23	1675	Speed	10/16/2002	66.90376	65.08724	53.43663	51.44709	53.70136	57.96932	54.04221	56.81693	54.34638	54.8371	65.79561
24	1676	Volume	10/16/2002	35	55	70	65	45	59	61	73	64	55	65
25	1676	Density	10/16/2002	6.652222	10.91556	14.37778	13.64868	9.417777	11.76	11.4	14.38857	12.45333	10.28	12.08667
26	1676	Speed	10/16/2002	21.6355	20.60648	20.61587	19.44704	20.74639	22.08267	21.96273	21.3238	21.68457	22.03235	22.46507
27	1677	Volume	10/16/2002	300	371	415	396	404	373	386	396	378	351	358
28	1677	Density	10/16/2002	18.82044	22.90641	26.25207	27.79172	27.17437	24.41946	25.16529	23.06899	26.04672	25.02254	24.40162
29	1677	Speed	10/16/2002	64.9628	65.62695	58.64362	58.12806	60.17092	61.80119	61.90932	63.03792	58.88361	58.92436	60.05529
30	1678	Volume	10/16/2002	512	577	623	581	596	613	569	547	599	596	533
31	1678	Density	10/16/2002	30.63704	35.39148	41.0626	39.38407	39.22962	39.60815	35.94555	34.62555	35.93741	35.97	32.5926
32	1678	Speed	10/16/2002	67.49839	65.64072	61.20387	59.48066	61.12396	62.2295	63.71481	63.6091	63.6508	63.29808	65.99965
33	1679	Volume	10/16/2002	11	23	47	68	81	71	111	77	83	78	58
34	1679	Density	10/16/2002	1.44	4.173333	9.017777	16.72444	12.16444	18.24889	24.31111	15.85333	18.47556	15.47556	7.573334
35	1679	Speed	10/16/2002	30.30131	23.43938	23.79806	17.30757	20.01763	16.53894	20.03542	21.83075	20.41773	22.77034	29.69079
36	1680	Volume	10/16/2002	325	408	477	462	466	451	478	440	441	439	427
37	1680	Density	10/16/2002	20.51641	25.62748	31.74045	31.22918	31.00526	29.52366	31.524	28.82951	30.29618	29.85954	29.54232

Figure IV-3 Composite File Example

The “Data File” format creates a comma separated value (csv) file for each data type selected. The files are stored on the hard disk in D:\temp directory. For example, if you selected volume, density and speed; the following default files would be created based on the data extract criteria selected:

Default filenames	Stored filename
- speed.csv	- 394EBspeed.csv
- volume.csv	- 394EBvolume.csv
- density.csv	- 394EBdensity.csv

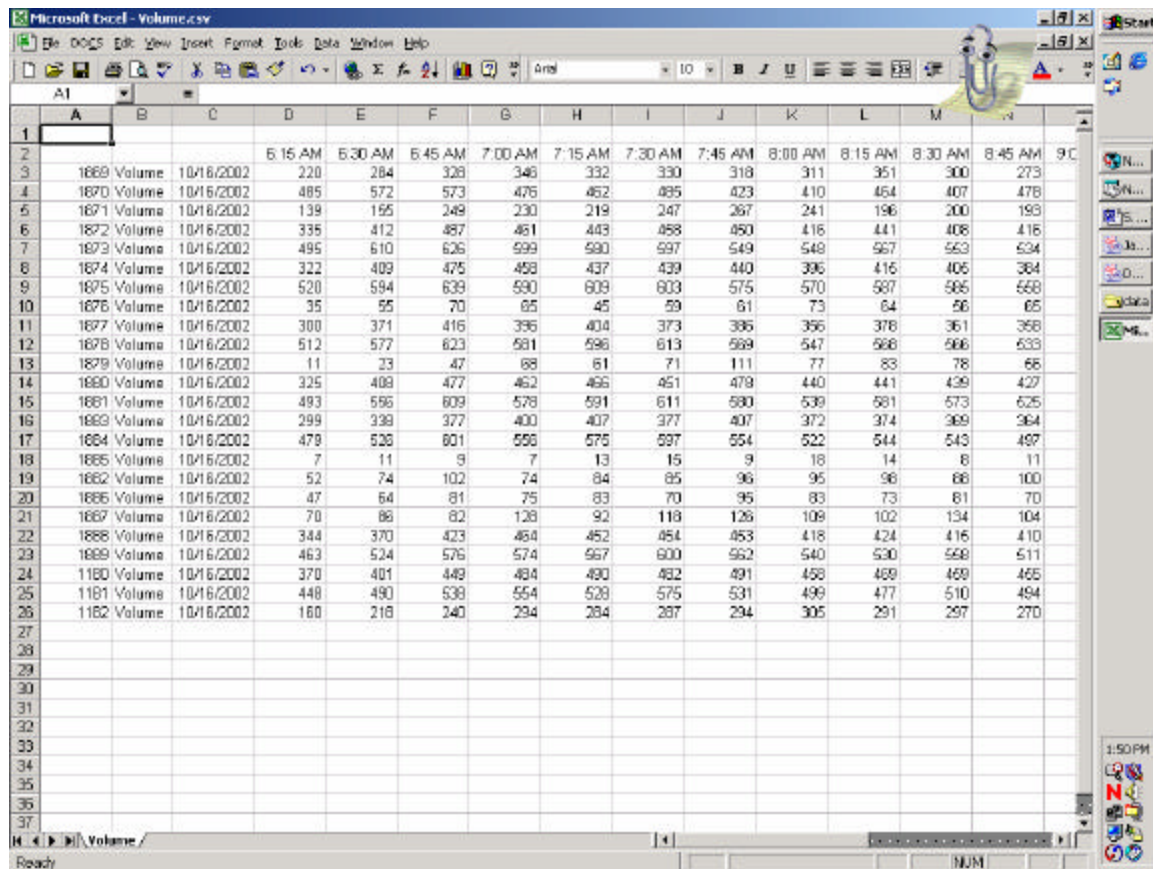
These files should be renamed and stored on disk prior to proceeding with your next data extraction. **Caution: The default files are over-written with each data extraction query.** Below are the sample default files created using the data file format. The speed file contains speed data for each detector and time period identified. This data is very useful when calibrating the existing system.



	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1														
2				5:15 AM	5:30 AM	5:45 AM	7:00 AM	7:15 AM	7:30 AM	7:45 AM	8:00 AM	8:15 AM	8:30 AM	8:45 AM
3	1669	Speed	10/16/2002	66.79539	63.83365	53.9649	40.33315	30.26635	34.62698	22.47468	22.62468	27.96039	31.65813	59.49021
4	1670	Speed	10/16/2002	70.18747	65.13938	54.89784	33.5058	26.80057	34.00175	23.26678	22.25436	27.05541	30.36126	64.88574
5	1671	Speed	10/16/2002	43.55956	23.77141	22.49764	26.78712	23.79165	28.83269	23.61327	24.29404	25.76436	32.06478	49.4843
6	1672	Speed	10/16/2002	64.16286	63.56287	50.01746	42.65728	36.18832	41.84798	38.81628	35.36874	37.00432	37.45834	59.19614
7	1673	Speed	10/16/2002	67.84529	64.10667	52.28799	43.60305	36.27942	42.26545	37.29384	35.78449	39.2899	40.12156	65.52997
8	1674	Speed	10/16/2002	66.23999	65.7034	54.86397	53.17782	52.51869	66.73766	64.60629	55.70229	51.25945	51.6443	58.63549
9	1675	Speed	10/16/2002	66.50376	65.08724	53.43563	51.44709	53.70136	57.98832	64.04221	56.81683	54.34638	54.8371	65.7561
10	1676	Speed	10/16/2002	21.8355	20.80649	20.81597	19.44704	20.74639	22.06267	21.96273	21.3238	21.66457	22.03235	22.46507
11	1677	Speed	10/16/2002	64.9528	65.62693	59.64362	58.12806	60.17092	61.60119	61.90832	63.03792	58.68361	58.92426	60.05529
12	1678	Speed	10/16/2002	67.48833	65.64072	61.20397	59.49066	61.12396	62.2295	63.71481	63.6091	63.6608	63.29608	65.99866
13	1679	Speed	10/16/2002	30.30131	23.43938	23.79806	17.30767	20.01763	18.53884	20.03842	21.63075	20.41773	22.77034	29.66079
14	1680	Speed	10/16/2002	63.73511	64.28838	60.5196	59.98432	60.44381	61.93377	60.94795	61.6772	58.90281	59.47779	58.94782
15	1681	Speed	10/16/2002	66.08766	65.73775	63.14078	62.28949	62.73285	63.93253	63.61936	64.06326	64.74618	65.08292	65.66164
16	1682	Speed	10/16/2002	63.21462	65.29953	57.83705	58.15241	60.19562	62.68065	59.98502	61.93632	60.90259	60.06146	60.25501
17	1684	Speed	10/16/2002	65.43636	64.73252	60.57016	61.03369	61.19696	62.31605	61.04724	63.68471	64.69304	64.66699	66.45097
18	1685	Speed	10/16/2002	29.79252	26.86616	30.00953	29.26103	30.83343	30.22431	33.53937	30.34135	31.51991	31.96181	28.57766
19	1686	Speed	10/16/2002	52.44734	52.55636	51.61741	47.21946	51.89637	50.47315	51.66795	51.745	52.70338	51.65214	52.68419
20	1688	Speed	10/16/2002	27.12706	28.38653	26.24157	26.20713	27.60863	29.66125	26.80284	29.0241	28.31161	28.30389	27.20925
21	1687	Speed	10/16/2002	54.19857	38.13158	24.94561	27.21722	26.26983	26.92465	26.23605	29.47191	30.45429	26.71517	55.0345
22	1688	Speed	10/16/2002	72.75718	74.29842	71.3744	70.70791	69.43414	72.61935	70.8891	70.67943	71.68946	67.90105	67.29357
23	1689	Speed	10/16/2002	75.60826	75.29049	73.59566	72.7212	72.08735	72.82063	72.90063	73.24181	73.20206	73.33378	74.14782
24	1180	Speed	10/16/2002	73.63812	73.5765	71.18377	68.86362	66.67195	65.42248	65.78364	70.22303	71.24434	68.46791	67.97696
25	1181	Speed	10/16/2002	73.25629	73.969	72.25984	70.31547	69.31369	64.79831	68.66947	71.07118	72.65111	72.61722	73.30837
26	1182	Speed	10/16/2002	47.83312	41.01031	39.24345	32.95884	33.47638	35.37971	33.40625	29.38685	31.22937	33.96042	34.24592
27														
28														
29														
30														
31														
32														
33														
34														
35														
36														
37														

Figure IV-4 Data File Example- Speed.csv

The volume file provides the volume data for each detector and timeframe identified. You should note that this file is structured in the same sequence as the speed and density file. This format is helpful in identifying suspect and bad detectors.



	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1														
2				6:15 AM	6:30 AM	6:45 AM	7:00 AM	7:15 AM	7:30 AM	7:45 AM	8:00 AM	8:15 AM	8:30 AM	8:45 AM
3	1869	Volume	10/16/2002	220	284	328	348	332	330	318	311	351	300	273
4	1870	Volume	10/16/2002	485	572	573	475	462	485	423	410	464	407	478
5	1871	Volume	10/16/2002	139	155	249	230	219	247	267	241	196	200	193
6	1872	Volume	10/16/2002	335	412	487	461	443	458	450	416	441	408	416
7	1873	Volume	10/16/2002	495	610	626	599	590	597	549	548	567	563	634
8	1874	Volume	10/16/2002	322	409	475	458	437	439	440	395	416	405	384
9	1875	Volume	10/16/2002	520	594	639	590	609	603	575	570	587	585	668
10	1876	Volume	10/16/2002	35	55	70	65	45	59	61	73	64	56	65
11	1877	Volume	10/16/2002	300	371	416	395	404	373	385	356	378	351	358
12	1878	Volume	10/16/2002	512	577	623	581	596	613	599	547	588	586	633
13	1879	Volume	10/16/2002	11	23	47	68	61	71	111	77	83	78	66
14	1880	Volume	10/16/2002	325	408	477	462	466	451	478	440	441	439	427
15	1881	Volume	10/16/2002	493	595	609	578	591	611	580	539	581	573	625
16	1889	Volume	10/16/2002	299	239	377	400	407	377	407	372	374	369	364
17	1884	Volume	10/16/2002	479	520	601	556	575	597	554	522	544	543	497
18	1885	Volume	10/16/2002	7	11	9	7	13	15	9	18	14	8	11
19	1882	Volume	10/16/2002	52	74	102	74	84	85	96	95	96	88	100
20	1886	Volume	10/16/2002	47	64	81	75	83	70	95	83	73	81	70
21	1887	Volume	10/16/2002	70	86	82	126	92	118	126	109	102	134	104
22	1888	Volume	10/16/2002	344	370	423	464	452	454	453	418	424	416	410
23	1889	Volume	10/16/2002	463	524	575	574	567	600	562	540	530	568	511
24	1180	Volume	10/16/2002	370	401	449	464	490	482	491	458	469	469	465
25	1181	Volume	10/16/2002	448	490	538	554	528	575	531	499	477	510	494
26	1182	Volume	10/16/2002	160	218	240	294	284	287	294	305	291	297	270
27														
28														
29														
30														
31														
32														
33														
34														
35														
36														
37														

Figure IV-5 Data File Example- Volume.csv

Below is an example of the density file created.

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1														
2				5:15 AM	5:30 AM	5:45 AM	7:00 AM	7:15 AM	7:30 AM	7:45 AM	8:00 AM	8:15 AM	8:30 AM	8:45 AM
3	1669	Density	10/16/2002	13.5446	18.26567	25.1762	36.26355	51.09145	48.17529	71.0004	67.21623	58.88311	47.08429	19.02378
4	1670	Density	10/16/2002	27.79736	35.5659	44.10864	62.64896	72.49417	62.76884	77.68774	83.0137	70.90951	65.36958	29.99643
5	1671	Density	10/16/2002	14.21526	31.04444	46.44445	37.58222	43.66665	36.77777	56.94222	51.88333	42.43111	30.31112	15.87598
6	1672	Density	10/16/2002	21.09686	26.1787	41.1391	44.34605	54.16406	45.01801	51.85843	50.7519	48.85268	46.96553	28.34348
7	1673	Density	10/16/2002	29.4119	39.37777	49.91469	56.19603	68.64961	59.06965	62.14127	66.05603	59.28215	61.03692	33.26627
8	1674	Density	10/16/2002	19.72036	25.19161	35.6834	35.17071	34.06306	31.32917	33.10666	28.9598	32.63429	32.003	25.45127
9	1675	Density	10/16/2002	31.57126	36.8816	49.38199	46.6046	45.85852	41.81685	44.2318	40.4977	43.77663	42.92107	34.49196
10	1676	Density	10/16/2002	6.862222	10.91526	14.37778	13.64889	9.417777	11.76	11.4	14.36667	12.45333	10.28	12.06887
11	1677	Density	10/16/2002	18.82044	22.90641	28.25207	27.79172	27.17437	24.41946	25.16529	23.06689	26.04672	25.02254	24.40162
12	1678	Density	10/16/2002	30.63704	35.39148	41.0626	39.36407	39.22926	39.60815	35.94555	34.62555	35.93741	35.95	32.5926
13	1679	Density	10/16/2002	1.44	4.173333	9.017777	18.72444	12.16444	18.24889	24.31111	15.85333	18.47556	15.47556	7.573334
14	1680	Density	10/16/2002	20.51941	25.62748	31.74045	31.22918	31.00526	29.52966	31.524	28.62961	30.29618	29.66954	29.54232
15	1681	Density	10/16/2002	30.08677	34.12063	38.89524	37.24444	37.79047	36.42116	36.54603	33.8836	36.02539	35.33122	32.41058
16	1682	Density	10/16/2002	19.62963	21.13631	26.39796	27.61091	27.21772	24.43053	27.32906	24.19591	25.10657	24.84461	24.84809
17	1684	Density	10/16/2002	29.55242	32.89741	40.0118	36.63218	37.72566	36.64669	36.66779	33.15925	33.62582	33.59339	30.24214
18	1685	Density	10/16/2002	0.931111	1.862222	1.32	1	1.756555	2.257778	1.206689	2.506667	1.791111	1	1.64
19	1682	Density	10/16/2002	4.368889	5.76	8.320001	6.44889	6.857778	7.093334	7.862221	7.635555	8.068889	7.444444	8.088889
20	1686	Density	10/16/2002	7.24	9.368888	13.41778	11.4	12.24	9.663333	14.45333	11.58667	10.56111	11.73778	10.69333
21	1687	Density	10/16/2002	5.653333	9.99111	13.37333	19.24445	14.47556	17.92669	19.96667	16.04	14.41333	21.56445	7.675555
22	1688	Density	10/16/2002	19.13909	20.02272	23.98814	26.46794	26.20807	25.20886	25.61778	23.87226	24.06782	24.83193	24.75226
23	1689	Density	10/16/2002	24.75128	28.15609	31.52209	31.53845	31.62846	33.05217	31.1457	29.51744	28.8424	30.52385	28.00372
24	1180	Density	10/16/2002	20.54966	22.31711	25.47636	28.24965	28.64714	30.65796	30.71412	26.30421	26.76006	27.12342	27.2952
25	1181	Density	10/16/2002	24.76252	26.78127	30.04016	31.51665	30.69201	36.1817	31.40277	28.04926	26.39608	28.18278	27.55056
26	1182	Density	10/16/2002	13.68	22.31111	25.81778	41.20445	37.27556	36.63111	40.63111	53.02222	48.3089	38.89778	35.32445

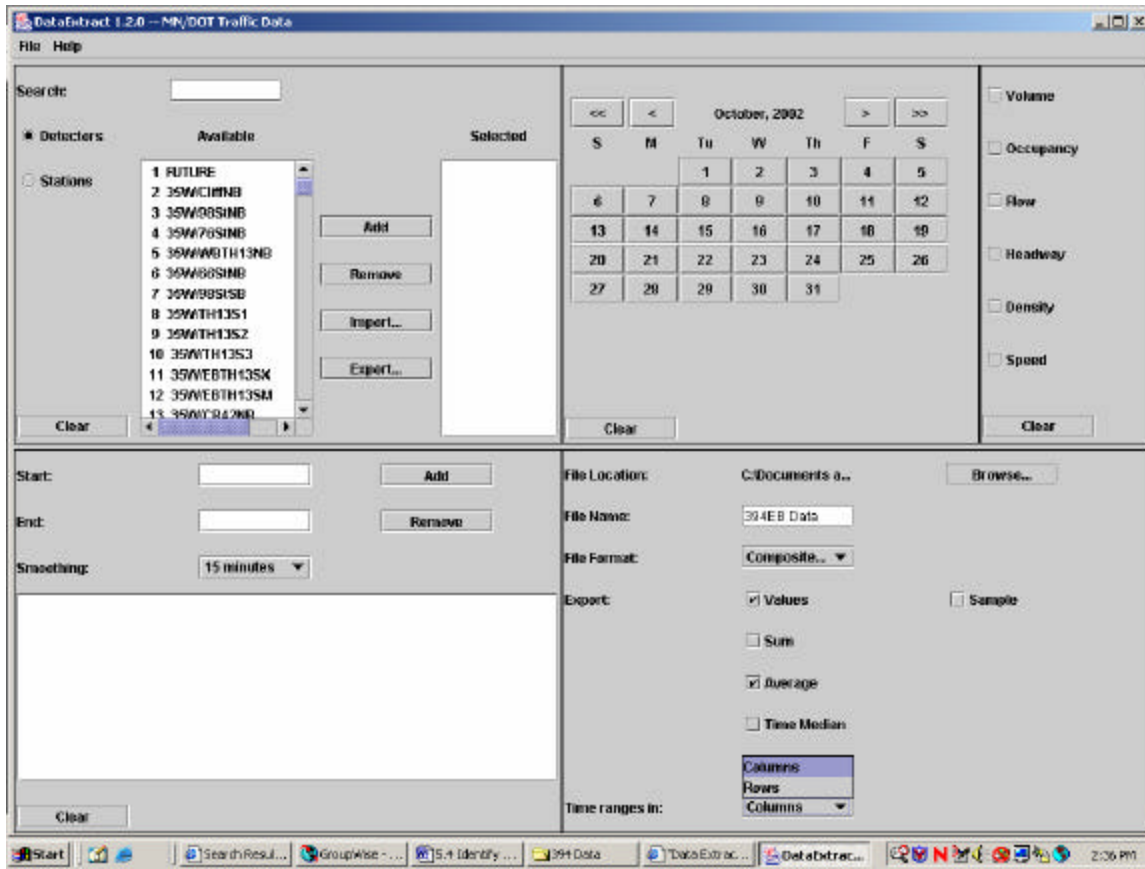
Figure IV-6 Data File Example- Density.csv

6. Select the Export Options

There are several data export options available including values, sum, average, time median, day median, and sample. Select the export options by clicking on the box next to the value. For example, if you want the raw data values (volume, density and speed) select the “Values” option by clicking on the box in the lower right section of the Data Extract window.

7. Select the Time Ranges Configuration

Use the “Time ranges in:” drop-down box to select the configuration of the time field in the “394EB Data” file that is about to be pulled. To set time ranges to a columns format click the drop-down menu and select “Columns.” Either Column or Rows can be selected, but be aware that the number of columns are limited within Excel. This may cause a problem when extracting large datasets. To set time to be in rows click the drop-down menu and select “Rows.” We recommend selecting the “Rows” time range format to eliminate this problem.

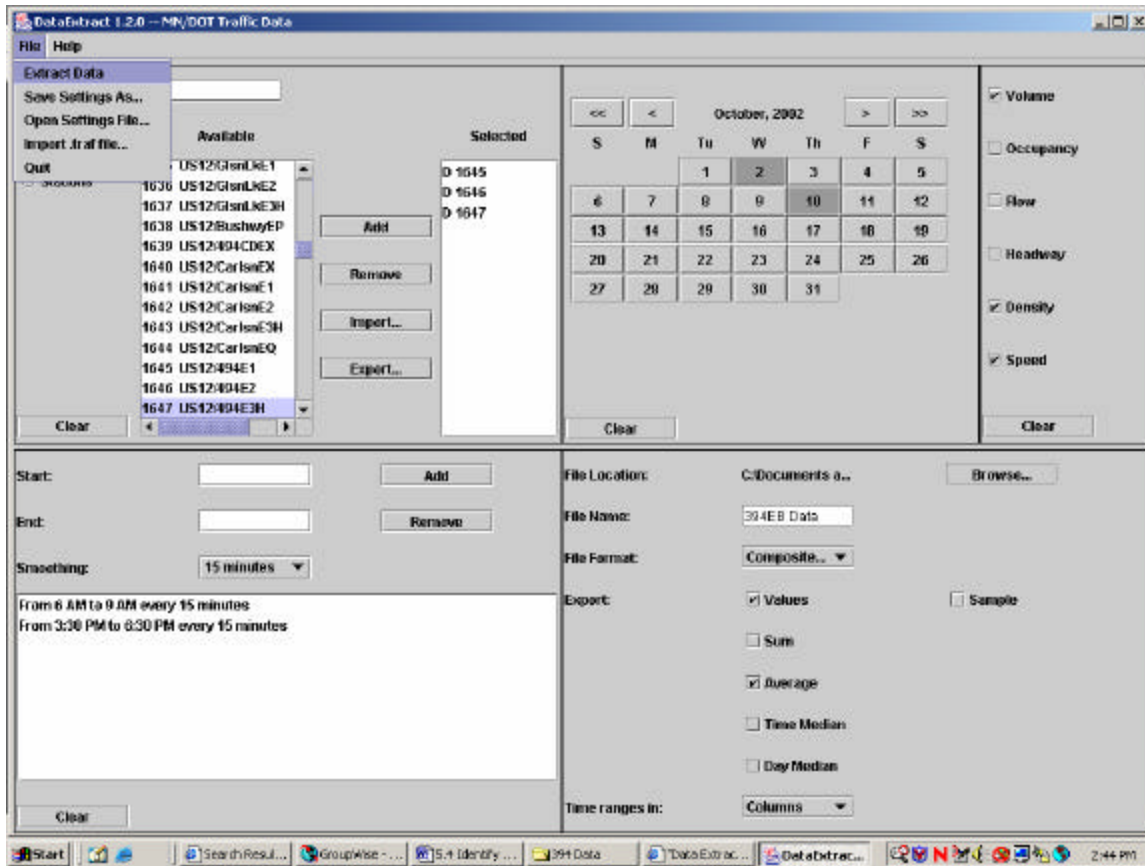


E. Extracting the Data

Once all of the parameters have been set the data is ready to be pulled. Simply click on the “File” menu at the top left corner on the tool bar and select “Extract Data.” Data Extract will notify the user when the extraction is complete.

- Verify the data file was created and stored to hard disk. Go to the d:/temp directory and open the file.
- Verify the data is in the correct format. This is a good time to note the detector(s) that are bad.
- Rename the default Excel files, if you have selected the Data file format.

For example, if an extraction was performed in which volume data was pulled into a “Data” file, the file will be named “data.” You will need to open and rename (394EB Data) this file after the extraction is complete.



F. Save Data

The data extraction for the mainline and ramp loops is complete at this point. You can now proceed to store the data to disk. The wipzip software has been provided to aid you in storing these files in an efficient format.

V. CHAPTER 5: RAMP CONTROL DATA

This section explains the IRIS report options available and walks you through the process of identifying a list of the affected ramp meter query data to determine the ramp metering timing to use within CORSIM.

Below is a listing of IRIS Report Options available to assist you in extracting ramp metering information and verifying detector data. The Continuity Report and Ramp Metering Analysis Reports are the most useful. The IRIS user manual can be found in Appendix D.



The screenshot shows the IRIS Report Main Menu. On the left is a teal sidebar with the iHUB logo at the top. Below the logo are sections: 'TMC Links' with a link to 'TMC Home'; 'IRIS reports:' with a list of report types (170 Controller, Algorithm, Continuity, Detector Volume, Ramp Meter, Queue Passage, Queue Wait, Timing); and 'Department Links' with icons for iHUB, Mn/DOT Home, and Northstar. At the bottom of the sidebar is a 'Search iHUB:' field with a 'go' button. The main content area has a header with the text 'Traffic Management Center IRIS Report: Index' and a logo for the 'Intelligent Roadway Information System' featuring a purple iris. Below the header, the text 'IRIS reports available online:' is followed by a bulleted list of report types, each with a purple underlined link: 170 Controller Sheets, Algorithm Report, Continuity Report, Loop Detector Volume, Ramp Meter Analysis, Queue Passage Analysis, Queue Wait Analysis, and Timing Report. At the bottom of the page, there are links for Minnesota Government (Northstar, Governor's Office, Search Internal Web Site, Mn/DOT External Web site) and General questions (info@dot.state.mn.us, Feedback / Suggestions).

Figure V-1 IRIS Report Main Menu

A. Continuity Report

The continuity report provides a quick review of the current status of the detector system. The report can be used to help identify detectors that are not functioning, undercounting, or off-line.

The Ramp Meter Analysis allows the user to query for the ramp meter timing on a specific day and time period.

B. Ramp Meter Analysis

Below outlines the procedure for acquiring the ramp metering timing in the affected project area using the IRIS Ramp Meter Analysis program.

1. Identify affected ramp meters

Refer to the Mn/DOT Traffic Management map or list of ramp meters in Appendix G. Identify and develop a list of meters within the modeling project limits.

2. Determine ramp meter operations

Cross reference the list of ramp meters with the current operating ramps by checking Appendix H, listing of stratified ramps meters. Contact the Mn/DOT's RTMC Operation unit at (651) 634-5311 to verify the ramp meters operations during peak periods.

3. Extract ramp meter rates

The screenshot shows the iHUB Traffic Management Center interface for the IRIS Report: Ramp Meter Analysis. The left sidebar contains navigation links for TMC Links (TMC Home, IRIS reports: 170 Controller, Algorithm, Continuity, Detector Volume, Ramp Meter, Queue Passage, Queue Wait, Timing), Department Links (iHUB, Mn/DOT Home, Northstar), Search iHUB, and the Minnesota Department of Transportation logo. The main content area features the Intelligent Roadway Information System logo and a form to enter Ramp Meter, Start time, End time, and Date. A 'Submit Query' button is present. Below the form, there are links for Minnesota Government links and general questions.

iHUB
Traffic Management Center
IRIS Report:
Ramp Meter Analysis

Intelligent Roadway Information System

Enter the Ramp Meter, Start time, End time, and date then click the "Submit Query" button to see the report.

Ramp Meter:
Start time(hh:mm:ss):
End time(hh:mm:ss):
Date(mm/dd/yyyy):

Minnesota Government links: [Northstar](#) | [Governor's Office](#)
[Search Internal Web Site](#) | [Mn/DOT External Web site](#)
General questions: info@dot.state.mn.us | [Feedback / Suggestions](#)

Figure V-2 Ramp Meter Analysis

Click on the “Ramp Analysis” desktop icon, to extract ramp metering rates using the IRIS Ramp Analysis program

Step 1: Enter the ramp metering identification number. For example: m100n32

Step 2: Enter the start and end time in (hh:mm:ss) format. For example: 6:00:00 means 6:00 A.M.

Step 3: Select the date

This date field can be either entered directly or through the calendar icon.

Direct Entry: Entering the date directly in the following format (mm/dd/yyyy).

Example: 10/16/2002

Calendar Entry: Start by clicking on the calendar icon. Select the month and year, and then double click on the date to fill-in the date field

Step 4: Submit the Query

Review the output file and write the information to disk.

iHUB

TMC Links

TMC Home

IRIS reports:

170 Controller
Algorithm
Continuity
Detector Volume
Ramp Meter
Queue Passage
Queue Wait
Timing

Department Links

Traffic Management Center

IRIS Report:

Ramp Meter Analysis

Enter the Ramp Meter, Start time, End time, and date then click the "Submit Query" button to see the report.

Ramp Meter:

Start time(hh:mm:ss):

End time(hh:mm:ss):

Date(mm/dd/yyyy):

Minnesota Government links: [Northstar](#) | [Governor's Office](#)
[Search Internal Web Site](#) | [Mn/DOT External Web site](#)
General questions: info@dot.state.mn.us | [Feedback / Suggestions](#)

Calendar - Microsoft Internet Explorer

October 2002

Su	M	T	W	Th	F	Sa
			01	02	03	04
05	06	07	08	09	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

Double click to select a date.

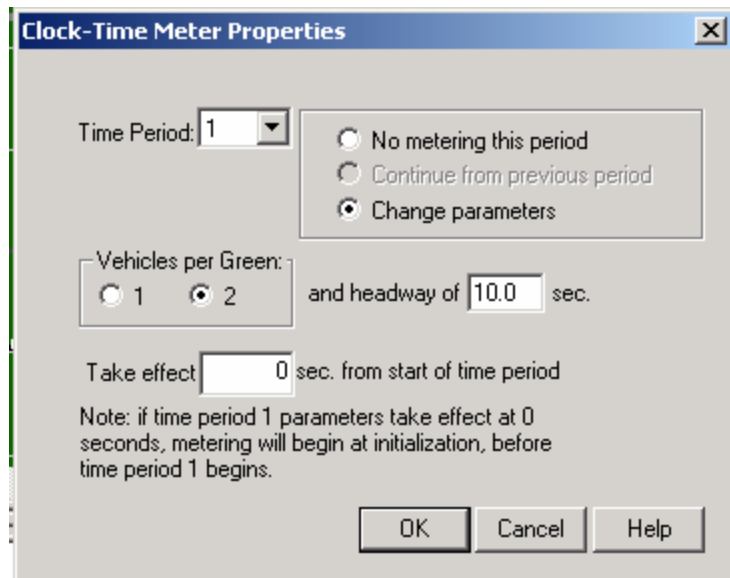
4. Interpreting Output

Figure V-3 provides a sample of the meter timing output. The cycle time is the time between the beginnings of one green to the beginning of the next green for one signal. This includes the red, yellow and green portions of the meter. For ramp meter (m100n32 at 7:15 am), there is 10 seconds between greens for each meter.

Approximately 2 seconds is used for the yellow and green. The green is allocated 1.3 seconds and the yellow .7 seconds. This is true for any ramp meter.

The green count is the number of cycles in a 30 second time period. This is also the number of vehicles that pass the meter in 30 seconds. For m100n32 at 7:15 am, the green count is 3. This means that each meter is letting 3 vehicles pass during that 30-second interval. As we are using dual metering, 6 vehicles can enter the freeway during this 30-second period.

For the parameters, use 2 vehicles per green with the headway set to the cycle length. This should account for the dual metering that is used at these locations.



Example of how the ramp meter timing is coded into CORSIM.

5. Save and Store Files

Step1: Select the Download csv file from the Ramp Meter output query screen.

Step 2: Select the option to save this file to disk

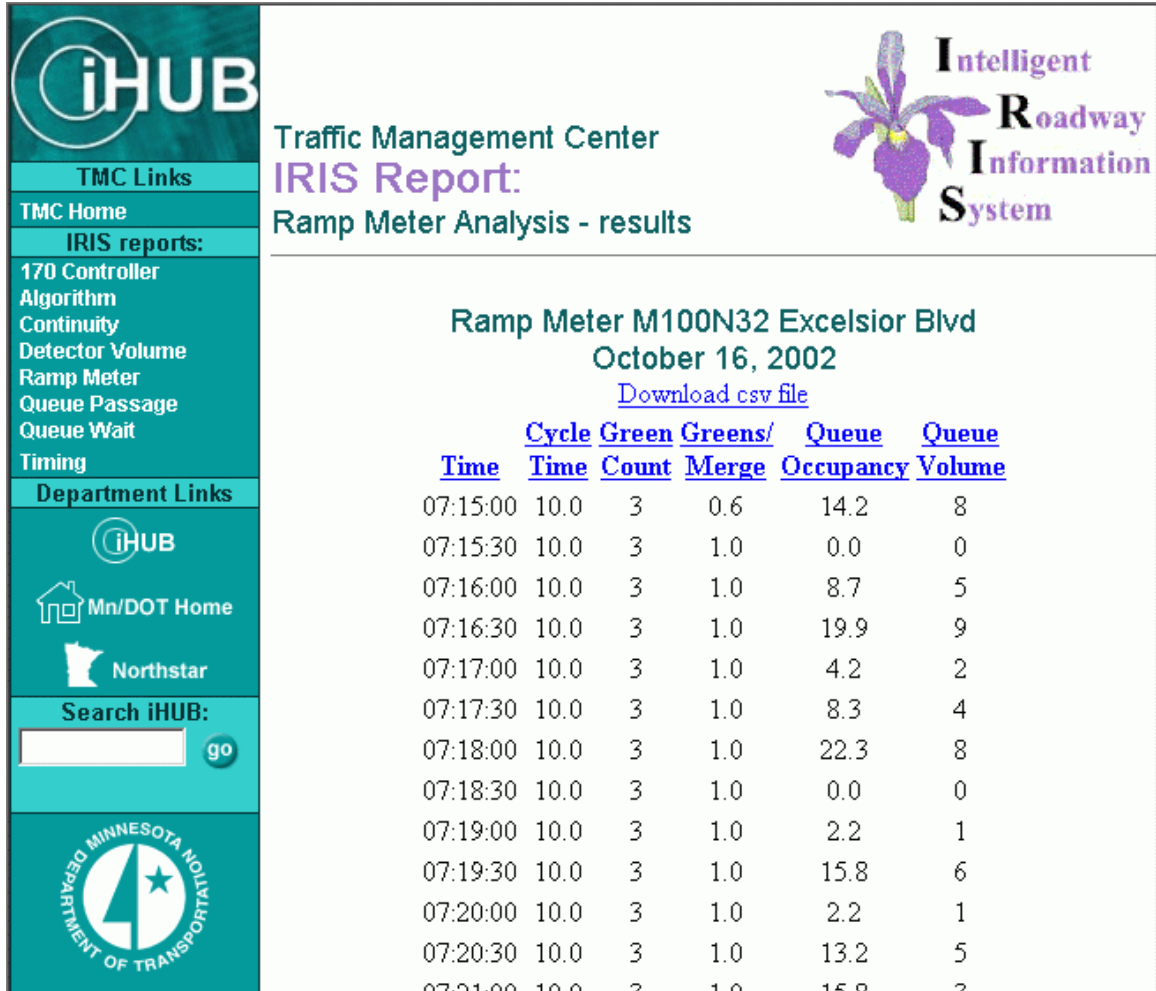
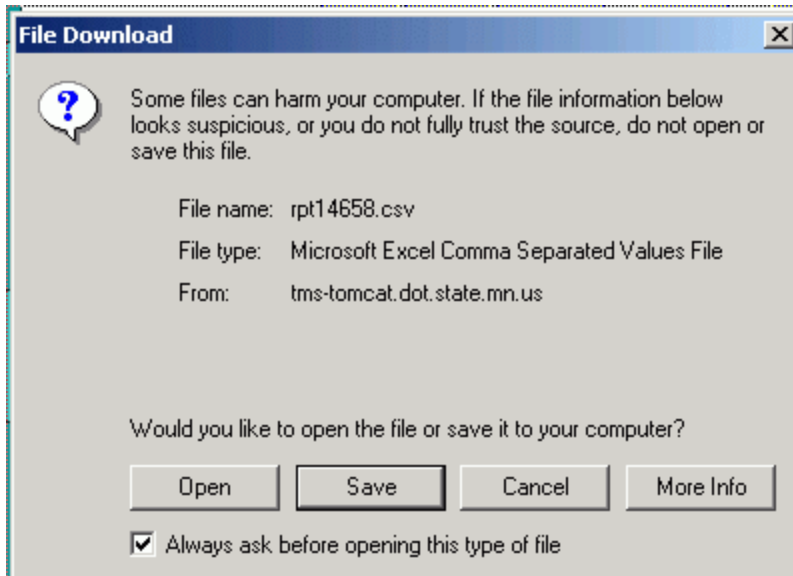
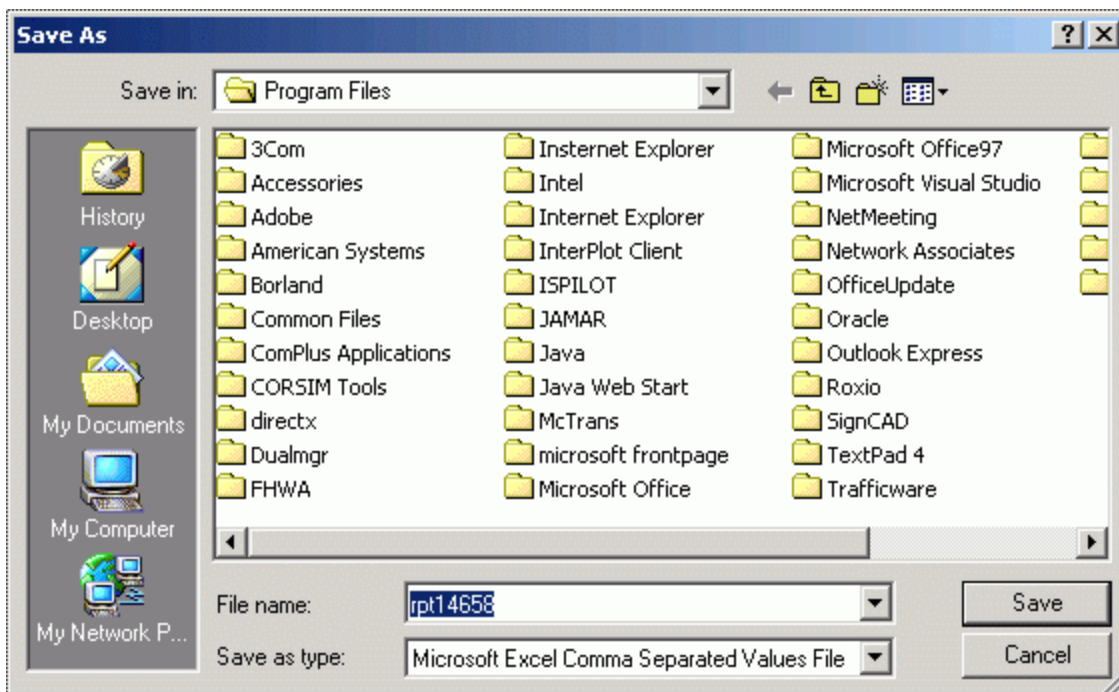


Figure V-3 Ramp Meter Timing Example

Step 3: Select the drive from the pop-down menu on the Save as screen.



Step 4: Enter a unique filename for each meter. We recommend using the metering identification in the filename.



Step 5: Repeat this process until you have stored ramp meter timing for all affected ramp meters.

Step 6: Verify that all the files have been stored on CD or Floppy drive.

Step 7: Data extracted from the ramp meter timing is complete.

Step 8: Shutdown the computer

Step 9: Sign out in the logbook and enter any suggestions or comments.

C. IRIS Ramp Analysis Help

Any numbers that are followed by an asterisk (*) indicate that there is a missing value or number. If a number is replaced by a question mark (?), this means that either all of the values for that total were missing or the result of the calculation was not a number (ie. division by zero).

1. Column Descriptions

Time: The start time in (hh:mm:ss) format for a 30-second interval.

Cycle Time: The number of seconds to complete the cycle of red, yellow, green.

Green Count: The number of greens given in that 30 second time interval.

Greens/Merge: The ratio of the number of greens given to the merge detector volume.

Queue Occupancy: The occupancy on the queue detector for the 30-second interval.

Queue Volume: The volume measured by the queue detector for the 30-second interval.

VI. APPENDIX